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**USAID/West Africa  
Evidence for Development  
AID-624-C-15-00001**

**Improving HIV outreach, knowledge, and linkage to  
PTC of KP in Togo: The role of mHealth and social  
media**

**OPERATIONS RESEARCH ANALYTICAL REPORT  
FEBRUARY 2018**

February 2018

This report has been made possible by the support of the American people through the United States Agency for International Development (USAID). The content of this report are the sole responsibility of International Business and Technical Consultants, Inc. (IBTCI) and does not necessarily reflect the views of USAID or the United States Government.

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## LIST OF ACRONYMS

90/90/90	Joint United Nations Program on HIV/AIDS Treatment Goals
CEDES	<i>Cabinet d'Expertise en Développement Economique en Afrique</i>
CI	Confidence Interval
CNLS	<i>Conseil National de lutte contre le Sida et les Infections Sexuellement Transmissibles</i>
CoPC	Continuum of Prevention and Care
CPHDA	Center for the Promotion of Human Rights and Development in Africa
DIC	Drop-in Center
E4D	Evidence for Development
FGD	Focus Group Discussion
FTF	Face-to-face
FSW	Female Sex Worker
HIV	Human Immunodeficiency Virus
ICT	Information and Communication Technology
KP	Key Population
mHealth	Mobile Health
MSM	Men Who Have Sex with Men
PACTE-VIH	USAID-funded Regional HIV/AIDS Prevention and Care Project
PLHIV	Persons Living with HIV
PTC	Prevention, Treatment and Care Cascade
OR	Odds ratio
OR	Operations Research
RRR	Relative Risk Ratio
SMS	Short Message Service (or text message)
STI	Sexually Transmitted Infection
UIC	Unique Identifier Codes
UNAIDS	Joint United Nations Program on HIV/AIDS
USAID	United States Agency for International Development
Y4	Year 4

# EXECUTIVE SUMMARY

## Background

Improved human immunodeficiency virus (HIV) prevention, treatment and care (PTC) of key populations (KP) – men who have sex with men (MSM) and female sex workers (FSW) – is essential to achieving the 2020 UNAIDS 90/90/90 goal. The UNAIDS goal targets 90% of HIV positive individuals aware of their status, 90% of those positive being on sustained anti-retroviral therapy (ART), and 90% of those in care being virally suppressed by the year 2020. In Togo, the HIV prevalence rate is 2.5% among the general population, yet remains high at 13.0% among MSM and 11.7% among FSW. Findings from the 2015 evaluation of the Regional HIV/AIDS Prevention and Care activity (PACTE-VIH) in Togo concluded that 62% of HIV positive and KP clients in PACTE-VIH supported services were linked to care, 53% were retained in care, and 29% were on therapy. Furthermore, FSWs (i.e. brothel-based and minors) and MSM (particularly those more than 30 years ) were even less likely to have been tested or been linked to care due to stigma and the lack of an enabling environment. Existing literature suggests that new Information and Communication Technology (ICT) might hold some promise for HIV interventions, especially in reaching the hard-to-reach KP. The ICT approaches range from mobile health (or mHealth) interventions to social media activities, channeled through online network-based forums. Against this backdrop, the USAID West Africa Regional HIV/AIDS Prevention and Care Project (PACTE-VIH), initiated ICT activities targeting KP in Togo, with mHealth and social media approaches employed to achieve a greater reach. PACTE-VIH mHealth consisted of sending reminder and alert SMS to people living with HIV (PLHIV) on Antiretroviral Therapy (ART) adherence and safe sexual practices as well as linking key populations (MSM and FSW) to services offered at the Drop-in-Centers (DIC) and improving linkage between DIC, other partner health facilities and related social services. In addition, PACTE-VIH and partners employed Facebook, Gayromeo (now called PlanetRomeo) and WhatsApp to reach some hard-to-reach MSM in order to increase access to PTC. The Government of Togo, represented by Dr. Pitche of the CNLS-IST, requested that E4D include FSW in the protocol for social media outreach.

## Objectives and Research Questions

This operations research aimed to examine ways in which mHealth (SMS messaging) and social-media (Facebook, Badoo, Gayromeo/PlanetRomeo, and WhatsApp) influence the use of face-to-face (FTF) PTC services by KP in Lomé, Togo. Specifically, the research aimed to: (1) Assess the influence of the use of social media in reaching KP who are not reached by current FTF method on increasing knowledge, use of services and linkage to PTC of KP through PACTE-VIH; (2) Determine the influence of SMS in improving linkage of KP to PTC; and (3) Identify barriers, mediating and/or moderating factors to the PACTE-VIH FTF PTC services.

The study aimed to answer the following research questions:

- (1) How does the use of short message service (SMS) improve the use of HIV services, knowledge, and linkage to prevention, treatment and care (PTC) of key populations (KP) in Togo through PACTE-VIH's face-to-face interventions?
- (2) How does the use of social media (Facebook, Gayromeo/PlanetRomeo and Badoo) improve the use of HIV services, knowledge, and linkage to prevention, treatment and care (PTC) of MSM in Togo through PACTE-VIH's face-to-face interventions??
- (3) What are the barriers to and facilitators of linkage to HIV prevention, treatment and care for KP members who receive mobile-phone based ICT (mHealth) or who are connected through a social media platform (Facebook, Badoo, Gayromeo/Planet Romeo) in Togo.

## Data and Methods

The study relies on quantitative and qualitative data. Quantitative data comprise the PACTE-VIH program data related to fiscal year 4 (FY4), from October 2015 to September 2016, and information from the quantitative survey conducted with 503 MSM and 502 FSWs in Lomé, Togo. The quantitative survey questionnaire enabled capturing of the following information: socio-economic characteristics of the key populations and their use of technology; the KPs' HIV knowledge, testing and use of HIV services as well as their enrollment in the program and their experiences with and opinions about HIV messages via SMS and/or social media. The qualitative data included: 12 Key Informant interviews (KII) with MSM and 13 Key Informant Interviews with FSWs as well as five Focus Group Discussions (FGDs) among which three were with MSM and two with FSWs. Qualitative surveys (KIIs and FGDs) relied on an interview semi-structured guide.

Quantitative data analysis methods encompassed chi-square and logistic regression models, whereas qualitative data analysis encompassed inductive and deductive coding techniques. Quantitative data analysis strategies comprised bivariate analysis, stratification, multivariate analysis and triangulation. All analyses were performed separately by KP type (MSM and FSW). Analyses were based on three categories of variables, including two independent variables, five dependent variables and five covariates or control factors. Independent variables are: (1) Exposure to the PACTE-VIH HIV-related SMS for each KP type; and (2) Exposure to the PACTE-VIH HIV related social media messages for MSM. The following variables constitute the dependent variables: (1) HIV-related level of knowledge; (2) use of DIC services; (3) preventive behavior (regular HIV testing); (4) use of treatment/care services; and (5) linkage to PTC. Controlling factors or socio-economic covariates include age, marital status, level of education, possession of a mobile phone and ownership of a computer. The last indicators, including the level of education and the ownership of a smartphone and/or a computer, are indicative of KP socio-economic status.

## Key Findings

Overall, according to the OR, more MSM were exposed to the PACTE-VIH HIV-related SMS (43.5%) compared to FSWs (9.6%). Findings from quantitative analyses are consistent with those from KIIs, especially for MSM. MSM owning a mobile phone and those aged 25 or above are more frequently exposed to the PACTE-VIH HIV-related SMS. In contrast, socio-economic barriers to exposure to the PACTE-VIH HIV-related SMS include being less than 25 years of age and not possessing a mobile phone or a computer. Though qualitative analysis (KIIs) highlighted that lack of mobile phone was the major barrier to exposure to the PACTE-VIH HIV-related SMS, results from quantitative data did not support that evidence, probably due to a limited number of KII respondents without a mobile phone.

Research Questions	Answers (Findings)
How does the use of short message service (SMS) improve the use of HIV services, knowledge, and linkage to prevention, treatment and care (PTC) of key populations (KP) in Togo through PACTE-VIH's face-to-face interventions?	<ul style="list-style-type: none"><li>• 43.5% of MSM are exposed to the PACTE-VIH HIV-related SMS compared to 10% of FSWs.</li><li>• 59% of MSM went face to face after receiving HIV-related social media message from PACTE-VIH.</li><li>• 33% of MSM exposed to HIV-related SMS had high HIV-related knowledge compared to 20% of MSM who were not exposed. Similarly, 27% of FSW who received an SMS had high HIV knowledge compared to 21% of FSW who did not receive an SMS</li><li>• 81% of MSM exposed to HIV-related SMS used DIC services compared to 50% of those who were not exposed. 94% of FSW who received SMS used DIC services compared to 63% who did not receive an SMS</li><li>• 93% of MSM who received an SMS performed regular HIV testing compared to 79% who never received an HIV related SMS.</li></ul>



Research Questions	Answers (Findings)
	<ul style="list-style-type: none"> <li>• The large majority of FSWs (77.3%) regularly tested for HIV test (at least once a year) (Figure 11). Similar to that of MSM, the proportion of FSWs who performed regularly HIV tests is significantly higher among those exposed to HIV-related SMS (96%), compared to those who never received the HIV-related SMS (75%).</li> <li>• As is the case with previous indicators (knowledge, outreach and HIV testing), the use of treatment services is significantly higher among the MSM exposed to the HIV-related SMS (67%) compared to their counterparts who were not exposed to HIV-related SMS (39%).</li> <li>• Less than half of FSWs surveyed (44%) have ever used the treatment and care services. This proportion is significantly higher among FSWs exposed to PACTE-VIH HIV-related SMS (67%), compared to their counterparts who were not exposed (41%).</li> <li>• Out of all MSM, 46.5% had high linkage to PTC. Overall, linkage to PTC is more frequent among those exposed to the PACTE-VIH HIV-related SMS (63%), compared to their counterparts who were not exposed to SMS (34%).</li> <li>• Less than 40% of FSWs surveyed had high linkage to PTC. As in the case of MSM, linkage to PTC is higher among FSWs exposed to the PACTE-VIH HIV-related SMS (65%), compared to those who were not exposed to the mHealth messages (36%).</li> <li>• The effect of exposure to the PACTE-VIH HIV-related SMS on the level of HIV-related knowledge is probably mediated by KP socio-economic characteristics, including age, marital status, education, possession of smartphone and/or computer.</li> <li>• Regardless of socio-economic category, the use of treatment/care services is higher among the MSM exposed to HIV social media message. MSM exposed to PACTE VIH social media had 7 times higher (OR: 6.89; CI: 4.08-11.67) to use treatment and care services than their counterparts who were not exposed after controlling for the effect of covariates.</li> </ul>
<p>How does the use of social media (Facebook, Gayromeo/PlanetRomeo and Badoo) improve the use of HIV services, knowledge, and linkage to prevention, treatment and care (PTC) of MSM in Togo through PACTE-VIH's face-to-face interventions?</p>	<ul style="list-style-type: none"> <li>• The percentage for low HIV-related knowledge is higher among the MSM who were not exposed (43%) to the PACTE-VIH HIV-related social media messages compared to their exposed counterparts (12%). On the contrary, the proportion of MSM with high HIV-related knowledge is higher among those exposed to the social media (43%), compared to MSM not exposed to HIV-related social media messages. MSM exposed to HIV-related social media messages have 76% less chance of having low HIV-related knowledge, compared to their counterparts who were not exposed.</li> <li>• The proportion of MSM who ever used PACTE-VIH services through DIC is higher among MSM exposed to HIV-related social media messages (91%), compared to their counterparts who were not exposed (51%).</li> <li>• Bivariate regression results indicate that the chance of visiting a DIC is 10 times higher among the MSM exposed to the PACTE-VIH social media HIV-related messages. This odd ratio is estimated at 9.2 (CI: 4.8-17.6) after controlling for other covariates. Furthermore, 59% of MSM went face to face after receiving HIV-related social media message from PACTE-VIH.</li> </ul>

Research Questions	Answers (Findings)
	<ul style="list-style-type: none"> <li>Whereas 92% of MSM exposed to HIV-related social media message underwent at least one HIV test per year, the corresponding proportion is estimated at 82% for their counterparts not exposed to social media.</li> <li>84% of MSM exposed to the PACTE-VIH HIV-related social media message ever used treatment/care services. However, only 37% not exposed to the HIV-related social media messages ever used the treatment and care services</li> <li>Out of all the MSM, 46.5% have high linkage to PTC. Overall, those exposed to social media messages had higher linkage to PTC e (79%), compared to their d counterparts (32%) who were not exposed. This finding is consistent with high linkage to PTC observed among both MSM and FSW exposed to HIV-related SMS</li> <li>The proportion of MSM exposed to both SMS and social media programs is estimated at 21%, whereas 23% are exposed to SMS only and 10% to social media only. About 47% of MSM are not exposed to SMS or social media.</li> <li>Whereas 85% of MSM surveyed reported being linked to prevention, falling short of the 90% UNAIDS goal, 92% of MSM exposed to the HIV-related social media message were linked to prevention, above UNAIDS 90-90-90 goal.</li> </ul>
What are the barriers and facilitators to linkage to HIV prevention, treatment and care for KP members who receive mobile-phone based ICT (mHealth) or who are connected through a social media platform (Facebook, Badoo, Gayromeo/Planet Romeo) in Togo?	<ul style="list-style-type: none"> <li>The primary facilitator of enrolling in the program and receiving a UIC is contact with a PACTE-VIH peer educator.</li> <li>A few important barriers included: not wanting to receive messages for confidential reasons; not using the internet at all; losing a phone or changing their SIM card; and, specifically among FSW, the inability to read or understand the language of the messages (developed in French)</li> <li>Mobility and fear of disclosure of sexual orientation were also identified as major barriers</li> </ul>

In assessing the outcomes defined in the first Research Question (**RQ1**), findings revealed that exposure to any PACTE VIH HIV-related program is positively associated with an improved knowledge and use of HIV-related services. Both MSM and FSW exposed to the PACTE-VIH HIV related program were significantly more likely to use the HIV services, including use of service, linkage to prevention, and use of treatment and care services. The effect is higher for MSM exposed to both HIV-related social media and SMS.

Regarding the second Research Question (**RQ2**), results suggest that exposure to any PACTE VIH HIV-related program increases HIV-related knowledge, use of DIC services, preventive behavior, treatment and care as well as high linkage to PTC, regardless of their socio-economic categories and/or after controlling for all covariates. The association between exposure to PACTE VIH mHealth or social media program and the use of HIV services, preventive behavior, use of treatment/care services and linkage to PTC remains significant after controlling for all covariates. In other words, MSM and FSWs exposed to the PACTE-VIH ICT were more likely to use the HIV services than their counterparts who were not exposed, regardless of their socio-economic categories. However, KP's age, marital status, and possession of computer mediated the association between exposure to PACTE VIH HIV-related program and high HIV knowledge among the MSM. Similarly, the effect of exposure to the PACTE-VIH HIV-related SMS on the level of HIV-related knowledge is probably mediated by FSWs' age, ownership of a smartphone and/or a computer, their marital status and their education. Indeed, the effect of the association between exposure to HIV-related program and high HIV-related knowledge disappears

after controlling for these factors. Finally, it appears that HIV-related knowledge and ownership of a smartphone and/or of a computer play an important role in linking KP to PTC.

The third Research Question (**RQ3**) was intended to assess the barriers to and facilitators of the outcomes addressed in RQ1 and RQ2. Results demonstrated that the most important barrier to receiving messages is not being enrolled in the PACTE-VIH program, and therefore not having a unique identification code (UIC). The results show that the primary facilitator of enrolling in the program and receiving a UIC is the contact with a PACTE-VIH peer educator. Other barriers to not receiving mHealth messages among both KP were: losing their phone, changing SIM card, and not using the internet.

## **Concluding Remarks and Program Implications**

In conclusion, given the above findings, the PACTE-VIH HIV-related SMS and social media messages are effective in improving the use of HIV services, linkage to prevention, and linkage to treatment and care. However, the same results raise the discussion about “efficacy” and “effectiveness” of the program. Although exposure to the PACTE-VIH messages (SMS or social media) was associated with a higher likelihood of using the HIV services (outreach, prevention and treatment/care), the messages reached only a few KP. PACTE-VIH HIV-related SMS messaging covered only 10% of FSWs surveyed. Similarly, about 53% of MSM surveyed were exposed to PACTE-VIH HIV-related SMS and/or social media messages among which 20% were exposed to both SMS and social media messages. Fear of sexual orientation disclosure and/or occupation status is one of the major reasons preventing enrollment into the PACTE-VIH program and getting the UIC. This finding is consistent with environmental barriers (internal and external) raised in the PACTE-VIH evaluation report in 2015.

Implications for future programs include: increase involvement of peer educators in programs for high penetration of the program, particularly among the FSWs; continue aligning the strategies by type of KP and technology preference; and ensuring strategies that allow KP to continue with the program even after changes in phone numbers. Efforts to improving the environment through fighting stigma should continue to boost the program penetration.

# I. BACKGROUND

## I.1 Problem Statement

In the West Africa region, HIV prevalence among the general population is relatively low, with the epidemic concentrated in key populations (KP), including men who have sex with men (MSM), female sex workers (FSW), and FSW clients (Papworth, 2013). In Togo, the HIV prevalence rate is 2.5% among the general population (*Ministère de la Planification du Développement et de l'Aménagement du Territoire* (MPDAT), *Ministère de la Santé* (MS), & ICF International, Demographic Health Survey 2015), yet remains high at 13.0% among MSM (CNLS, 2015a) and 11.7% among FSW (CNLS, 2015b).

Improved HIV prevention, treatment and care (PTC) of KP is essential to achieving the 2020 UNAIDS 90/90/90 goal (UNAIDS, 2014). This UNAIDS objective targets 90% of HIV positive individuals aware of their status, 90% of those positive being on sustained anti-retroviral therapy (ART), and 90% of those in care being virally suppressed by the year 2020. Achievement of these goals depends on engaging KP at each step along the PTC cascade.

Only recently have governments in West Africa recognized the role of KP in the epidemic and have begun to prioritize these groups in national strategies, which include employing information and communication technology (ICT) to help attain the 90/90/90 goals and ideal levels of HIV testing, prevention, treatment, linkage to PTC and retention behaviors. Findings from the 2015 evaluation of the Regional HIV/AIDS Prevention and Care activity (PACTE-VIH) in Togo concluded that 62% of HIV positive and KP clients in PACTE-VIH were linked to care, 53% were retained in care, and 29% were on therapy. Furthermore, FSWs (i.e. brothel-based, and minors) and MSM (particularly those more than 30 years) were even less likely to have been tested or be linked to care (IBTCL, 2015) due to stigma and the lack of an enabling environment.

Existing literature suggested that new Information and Communication Technology (ICT) might hold some promise for HIV interventions, especially to reach KP. The ICT approaches range from mobile health (or mHealth) interventions to social media activities, channeled through online network-based forums (Sheoran et al., 2014; USAID, 2014). Mobile information aims to empower clients to be proactive in their health care, enabling better self-care and health decision-making, especially for KP with limited access to health services. ICT interventions such as mHealth (SMS) and social media have been used in most countries in West Africa for a variety of HIV prevention and treatment topics, almost entirely directed at the general population and often small-scale pilots with only preliminary descriptive results or evaluations (USAID, 2011, 2014).

PACTE-VIH, the USAID/West Africa funded regional HIV/AIDS project, initiated ICT activities targeting KP in Togo, with mHealth and social media approaches employed to achieve a greater reach. PACTE-VIH mHealth consisted of sending reminder and alert SMS to people living with HIV (PLHIV) on Antiretroviral Therapy (ART) adherence and safe sexual practices as well as link key populations (MSM and FSW) to services offered at the Drop-in-Centers (DIC) and improve linkage between DIC, other partner health facilities and related social services. In addition, PACTE-VIH and partners were using Facebook, Gayromeo (now called PlanetRomeo) and WhatsAppto reach some hard-to-reach MSM in order to increase access to PTC. The Government of Togo, represented by Dr. Pitche of the CNLS-IST, requested that E4D include FSW in the protocol for social media outreach.

However, there is lack of research-based evidence regarding the role of SMS and social media in improving access to and utilization of PTC of HIV by KP, particularly in Togo. Therefore, the USAID/West Africa funded regional Evidence for Development (E4D) Project conducted this operation research (OR) to generate sound evidence for key stakeholders.

## 1.2 Study Objectives and Research Questions

Overall, the operations research aimed to examine the ways in which mHealth (SMS messaging) and social-media (Facebook, Badoo, Gayromeo/PlanetRomeo) and WhatsApp influence the use of face-to-face (FTF) PTC services by KP in Lomé, Togo. Specifically, the research aimed to:

1. Assess the influence of the use of SMS, in reaching KP who are not reached by current FTF methods, in increasing the use of HIV services, knowledge and linkage to PTC of KP through PACTE-VIH;
2. Determine the influence of social media (Facebook, Gayromeo/PlanetRomeo and Badoo) in improving linkage of MSM to PTC; and
3. Identify barriers, mediating and/or moderating factors to the PACTE-VIH FTF PTC services.

This study aimed to answer the following research questions:

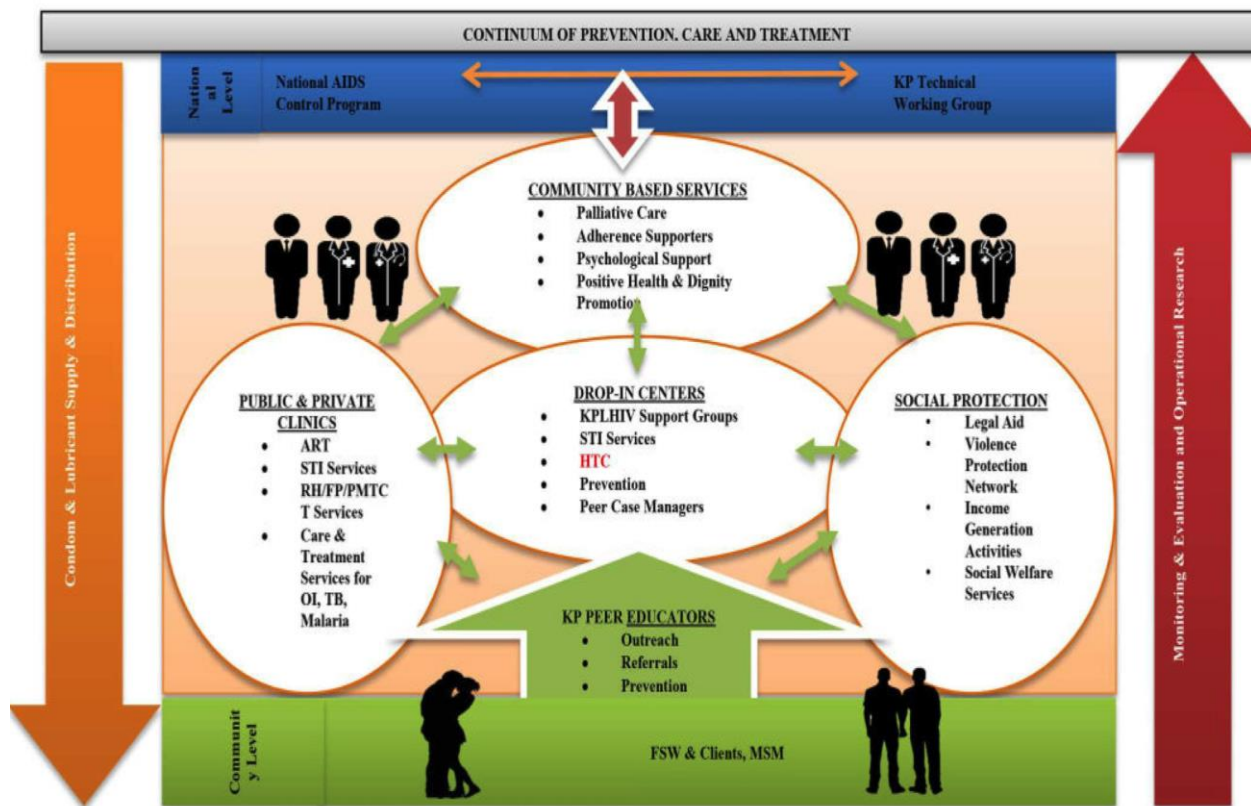
1. How does the use of short message service (SMS) improve the use of HIV services, knowledge, and linkage to prevention, treatment and care (PTC) of key populations (KP) in Togo through PACTE-VIH's face-to-face interventions?
2. How does the use of social media (Facebook, Gayromeo/PlanetRomeo and Badoo) improve the use of HIV services, knowledge, and linkage to prevention, treatment and care (PTC) of MSM in Togo through PACTE-VIH's face-to-face interventions?
3. What are the barriers and facilitators to linkage to HIV prevention, treatment and care for KP members who receive mobile-phone based ICT (mHealth) or who are connected through a social media platform (Facebook, Badoo, Gayromeo/Planet Romeo) in Togo?

The present report summarizes findings from the OR to answer the above research questions, determining whether KP exposed to mHealth and social media strategies are better placed than their counterparts who were not exposed regarding the use of services, and linkage to PTC. The target audiences for the report are: the USAID/WA Regional Health Office (RHO); other USAID health offices in the region; the Government of Togo (specifically the *Conseil National de Lutte contre le Sida* (CNLS)); FHI 360, the implementing partner, and other donors and partners in the health sector as well as stakeholders in HIV, particularly those working with the vulnerable and key populations in West Africa.

## 1.3 The PACTE-VIH Model

The five-year PACTE-VIH Program (August 2012 – August 2017), implemented by FHI 360, aimed to develop scalable and replicable intervention models to address the critical health gaps for KP in Burkina Faso and Togo. To achieve these goals, PACTE-VIH designed a continuum of prevention and care model (CoPC), defined as a coordinated network of prevention, treatment, care, and support activities for KP and people living with HIV (PLHIV) (PACTE-VIH, 2014). The CoPC is centered on a local service network of community-based structures (e.g. drop-in centers (DIC) or community clinics) to offer clinical services and a wide range of associated community-based services including health education, psychosocial support, referral to other relevant services, and home-based care. The PACTE-VIH CoPC model used the HIV PTC cascade to conceptualize linkages among services in selected areas, and to identify key gaps and opportunities to optimize the intervention (PACTE-VIH, 2014). Figure 1 describes the PACTE-VIH model to identify, link and refer KP to comprehensive HIV services.

**Figure 1 – The CoPCT model illustrating referral networks linking key populations to a comprehensive package of service**



Source: PACTE-VIH (2017)

The intervention model included the provision of essential and comprehensive prevention and support services targeting adult KP through affiliated facilities which offer a standardized package of CoPC services, including HIV testing and counseling, and STI services, referrals, peer education outreach activities, social events for KP, psychosocial counseling and support groups, distribution of condoms and lubricants, creation of human rights and Gender-Based Violence awareness and support services as well as income generating-activities. Peer educators were recruited from KP to conduct outreach, promote prevention activities (testing, using condoms and lubricants), provide referrals to services and conduct monitoring activities. Peer educators were often able to help increase enrollment of a more diverse group of KP by reaching individuals who may not want to be identified as members of a KP, particularly among MSM (Zan et al., 2016).

PACTE-VIH also initiated ICT activities targeting KP, with mHealth and social media approaches employed to achieve a greater reach of online network-based forums (Sheoran et al., 2014; Riley, 2014). In November 2014, PACTE-VIH began implementing the SMS sensitization program for KP in Togo. The PACTE-VIH mHealth campaign targets PLHIV and KP. Mobile Technology, including the use of mobile phones and internet-connected computers, was used to improve delivery and to strengthen access to referral-review-remind and recall as well as link key populations to services offered at the Drop-in-Centers (DIC) and improve linkage between DIC, other partner health facilities and related social services. The model assumed that people reached through mHealth applications would have more HIV knowledge and were more likely



to take preventive and curative measures than others. The SMS served as an alert system to effect behavioral change and to improve adherence to ART. It was also meant to do the following:

- Remind PLHIV to take ARVs as prescribed;
- Remind KP to systematically use condoms and lubricants anytime they have sexual intercourse;
- Invite KP to utilize PTC services and seek early treatment for STIs; and
- Remind KP to check their HIV status every three months. Two types of messages (Healthy Living and Lifeline) were developed and approved in collaboration with the national coordinating bodies, the health workers and beneficiaries (PLHIV, FSW and MSM).

Healthy Living messages focused on HIV preventive behaviors for each KP. SMS were sent out twice a week with a different message in each instance. One example of the message is:

- *“Protect yourself and your partner. Always use a condom and lubricant anytime you have sexual intercourse.”*

Lifetime messages served as reminders for ART adherence to PLHIV and were sent out on a daily basis to ensure that they take their drugs as prescribed. An example is:

- *“My life is precious; I take my medicines every day and I am fit.”*

A comprehensive list of the messages sent via SMS can be found in appendix I.

In parallel, PACTE-VIH and partners employed social media to reach some hard-to-reach MSM in order to increase access to PTC. To that end, peer educators (PE) sent private messages to their online social media contacts on platforms such as Facebook, Gayromeo (now called PlanetRomeo) and WhatsApp. The social media strategy aimed to do the following:

- provide HIV-prevention messages to MSM who were not reached through conventional outreach activities, including social and behavior change communication (SBCC) activities (community outreach, group and one-on-one sensitization sessions, and in-house/hospital visits), commodity distribution (distribution of condoms and lubricants), and referrals (to clinics or DICs). Through these activities, PEs were able to reach members of their own key populations, increase their knowledge of HIV, and help them to reduce risk behavior and HIV transmission;
- refer hard-to-reach MSM to HIV and STI related services; and
- promote the uptake of HIV counseling and testing by hard to reach MSM (Zan et al., 2016).

PACTE-VIH also implemented a Unique Identification Code (UIC) to track linkage to and use of PACTE-VIH services. The UIC is an anonymous code that serves as the primary mode of identification of PACTE-VIH patients or clients. Peer educators assigned a UIC to each KP members who had ever patronized the PACTE-VIH services through the drop-in center (DIC). Peer educators recorded the UIC on a referral coupon, which was then verified by the clinic to ensure accuracy and to determine if the client had previously visited the clinic. Once a UIC had been assigned, KP records were maintained under this code, and peer educators could identify and contact individuals using the system (Zan et al., 2016).

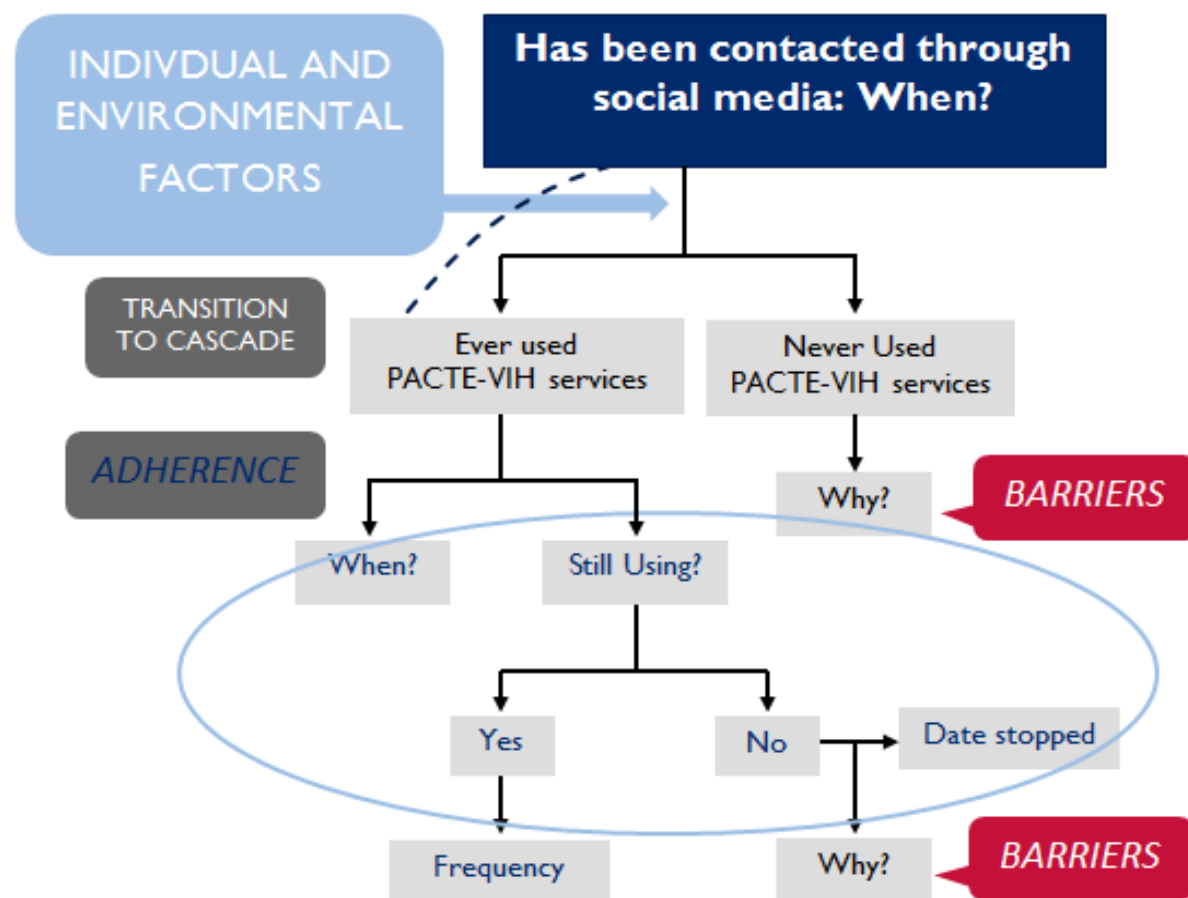
## 2. DATA AND METHODS

### 2.1 Conceptual Framework

This operations research (OR) is a combination of exploratory/diagnostic research and evaluation, conducted while the PACTE-VIH intervention was ongoing. The study focused on MSM and FSW in the city of Lomé, where the greatest number of these KP reside. Participants were 18 years of age or older, gave informed consent and met the following criteria: (i) any man who had reported ever having sex with a male partner, and (ii) any woman that engaged in commercial sex activities as a source of livelihood.

Figure 2 summarizes the relationship between the use of social media and PTC among KP, depicting the two major phases of social media engagement examined in this study: transition from exposure to social media messages to engagement in PTC (linkage) promoted through social media and barriers to and facilitators of linkages.

**Figure 2: Model to assess Social Media**



Source: Dr. J. Emina, March 2016

This conceptual framework guided the research approach. Investigation of research questions related to SMS relied on a conceptual framework similar to Figure 2. The framework allowed for analysis of the transitions from exposure to SMS messages or HIV-related social media message to the five outcomes: (1) HIV-related level of knowledge; (2) use of the PACTE-related services through Drop in Center (DIC); (3) preventive behavior (regular HIV testing); (4) use of treatment/care services. Furthermore, it allows us to identify barriers and/or facilitators of linkage to the PTC cascade.

HIV-related knowledge is a composite variable, “knowledge index”. This indicator was constructed using principal component analysis (PCA) based on the survey questions pertaining to respondents’ knowledge of the following indicators: methods to reduce risk of HIV infection and transmission, HIV testing locations, where to receive HIV treatment and medications, and where to find other related services. The first factor is divided into a tertile (three equal-sized segments) by KPs type (MSM and FSWs). This variable has the following three categories: low HIV-related knowledge; intermediate HIV-related knowledge; and high HIV-related knowledge. In a nutshell, the indicator was created separately for MSM and FSWs. Use of DIC services is a dummy variable (Yes/No), referring to whether respondents have ever visited the PACTE



VIH drop in center (DIC) regardless of the services used (counseling, HIV test, treatment/ care). Preventive behavior is a binary (Yes/No) variable, which refers to whether respondents were frequently tested for HIV and received the results ('tested and received results regularly' = 1-4 times a year and 'does not test regularly' = less than once a year). Use of treatment and care services (HIV/AIDS/STIs) is a dummy (Yes/No) variable, defined as whether respondents received services at PACTE-VIH and/or whether PACTE-VIH personnel referred them to other services. Preventive behavior and the use of treatment/care are not specific to the PACTE VIH services. Some KP might use HIV related services from other institutions. This study shows only the association between the PACTE VIH messages (SMS and/or social media) and HIV related health seeking behavior.

Linkage to PTC has two categories (Yes/No), and refers to respondents that are both linked to prevention and treatment and care. For the purposes of this report, E4D will refer to variables (2) and (3) as PTC.

The independent variables are exposure to the PACTE-VIH HIV-related SMS messages for MSM and FSW, and exposure to the PACTE-VIH HIV-related social media messages for MSM only. All these variables are dichotomous (exposed or not exposed).

The control variables (covariates) included socio-economic characteristics (factors) such as age, marital status, level of education, ownership of a smartphone and/or a computer. The last indicators, including the level of education and the ownership of a smartphone and/or a computer represent KP socio-economic status. We assume that KPs with high level of education (secondary and above), and those owning a smartphone and/or a computer belong to high socio-economic status.

## 2.2 Data

This OR employed mixed-methods using primary and secondary data. Primary data included quantitative information from a purposive sample of KP and qualitative data from in-depth interviews (IDIs) and focus group discussions (FGDs) collected from KP and key stakeholders. Secondary data encompassed data from PACTE-VIH programmatic data collected in year 4 (Y4) (12 months of data, 2016 data), to help support and better understand data gathered from KP. As noted above, three types of data were used for this report: 1) existing PACTE-VIH programmatic data; 2) KP quantitative survey data (Evidence for Development (E4D) West Africa, 2016b); and 3) KP qualitative data from FDGs and IDIs (Evidence for Development (E4D) West Africa, 2016b).

### 2.2.1 PACTE-VIH Programmatic Data

This study used two PACTE-VIH databases: mHealth database for fiscal Y4 (October 2015 – September 2016); and the social media database for fiscal Y4 (October 2015 – September 2016). These databases contain data on number and type of SMS messages sent and their result (delivered, failed, expired); and the number of new and old contacts from the social media database (only MSM), including age and topic discussed during the contact, as well as referrals. Y4 was selected for assessing programmatic data due to the maturity of PACTE-VIH program and ability to capture accurate portrayal of the program at the time of the OR. In Togo, there were an estimated 257 MSM and 380 FSWV enrolled on the SMS platform. The social media program reached a total of 541 MSM by the end of September 2016.

### 2.2.2 Quantitative Survey Data

Quantitative survey consisted of a convenience sample of survey participants drawn from multiple pools of potentially eligible respondents from both KP of interest, MSM and FSWV. To achieve the desired sample, the team targeted 1,500 KP based on an anticipated refusal rate of 60% depending on recruitment source. Trained staff from the *Cabinet d'Expertise en Développement Economique en Afrique* (CEDES) collected data in Lomé between July 20 and August 14, 2016, using a

structured questionnaire. The training and implementation of fieldwork by CEDES was part of a capacity building effort E4D is conducting in the region. PACTE peer educators supported the recruitment of study participants by connecting study personnel with KP and conducting phone calls inviting KP to participate. The survey design aimed to capture KP experiences with PACTE-VIH efforts to increase access to HIV PTC through the use of ICT. Data collected provides information on KP socio-demographic backgrounds, HIV knowledge and testing history, awareness of PACTE-VIH, use of face-to-face (FTF) services and referrals, use of technology and ICT (including mHealth/SMS and social media), experiences with HIV messages received via ICT channels, and opinions and preferences regarding such messages. The survey technical report describes the survey procedures (Evidence for Development (E4D) West Africa, 2016a).

The pools of prospective survey participants for sampling included: SMS and social media contacts entered in the PACTE-VIH program, in-person clients at the program's KP-specific DIC, and KP-frequented venues recommended by the community-based organizations working with KP and/or included in PACTE-VIH's 2012 mapping of KP activities in Togo.

Table I presents the survey response rates by type of interview and method of recruitment. The sample includes a total of 1,005 KP made up of 503 MSM and 502 FSW.

**Table I – Sampling and recruitment details for survey participant by Key Population**

	MSM		FSW		Total	
	%	N	%	N	%	N
<b>Survey response rate</b>						
- Complete	100.0	503	100.0	502	100.0	1005
<b>Survey interview type</b>						
- In-person (Face-to-Face)	87.3	439	98.0	492	92.6	931
- Phone	12.7	64	(2.0)	10	7.4	74
<b>Survey Method of recruitment</b>						
- SMS	(2.8)	14	-	-	(1.4)	14
- Social media	(3.2)	16	-	-	(1.6)	16
- Phone call	44.3	223	11.8	59	28.1	282
- Venue	(0.6)	3	32.9	165	16.7	168
- Peer educators (Face-to-Face)	44.7	225	43.8	220	44.3	445
- Drop-In-Centre (DIC)	(4.4)	22	11.6	58	8.0	80

Note: % in parentheses (N<30)

Engagement of peer educators during the study (recruitment of KP and introduction of study) explains achievement of 100% interview rate. E4D employed largely face-to-face interview method with the KP (93%) compared to 7% interviewed via phone call. The proportion of face-to-face interviews was higher (98%) among FSWs, compared to the MSM (87%). The recruitment methods also varied by type of KP. Overall, peer educators recruited 44% of the participants (45% MSM and 44% FSW). The importance of other recruitment methods varies by type of KP. Recruitment by phone (call and SMS) represented 47% of MSM participants. Recruitment at brothels and hotels represented 33% of FSW participants, whereas that in the DIC represented only 4% of MSM and 12% of FSWs.

Table 2 reports the socio-economic characteristics of the sample. The large majority of MSM participants (77%) were aged less than 30 years old, single (90%), most had some secondary or higher education level (89%). On average, MSM were aged 27 years.

**Table 2 – Sample description**

Socio-economic characteristics	MSM		FSW		Total	
	%	N	%	N	%	N
<b>Age</b>						
<25	44.3	223	32.5	163	38.4	386
25-29	32.6	164	29.9	150	31.2	314
30&+	23.1	116	37.6	189	30.4	305
<b>Marital status</b>						
Not in union	90.7	456	78.7	395	84.7	851
In union	9.3	47	21.3	107	15.3	154
<b>Education</b>						
Less than secondary	10.9	55	54.5	273	32.7	328
Secondary&+	89.1	448	45.5	228	67.3	676
<b>Phone ownership</b>						
No	4.2	21	21.3	107	12.7	128
Standard cell phone	28.4	143	54.0	271	41.2	414
Smartphone	67.4	339	24.7	124	46.1	463
<b>Own computer</b>						
No	71.2	358	96.2	483	83.7	841
Yes	28.8	145	3.8	19	16.3	164
Total	100.0	503	100.0	502	100.0	1005

Note: % in parentheses (N<30)

Table 2 also shows that 79% of FSWs who participated in the study had never been in union. About 60% were aged less than 30 years. Contrary to MSM, the majority of FSWs (55%) did not attend secondary school and/or own a smartphone (75%) and/or a computer (96%).

*Is the OR sample population similar to PACTE-VIH database population in year 4 of the program?*

PACTE-VIH database encompasses only the variable “age”. Furthermore, the database does not differentiate Lomé from other cities where data were collected. The average age of MSM in the PACTE-VIH database was 27.2, which was similar to the average age of MSM participating in the E4D OR (27 years).

### 2.2.3 Qualitative Data

Qualitative data included five (5) Focus Group Discussions (FGDs) with KP (two with FSW and three with MSM) and 25 In-depth Interviews (IDIs) with 12 MSM and 13 FSWs. FGDs explored the topics covered in the structured survey in more detail with select members of KP and subgroups (i.e. brothel-based FSW, hotel-based FSW, and older MSM) reached through social media, and those receiving SMS messaging and or FTF services under PACTE-VIH. FGDs provided an opportunity to gauge the opinions of KP about the usefulness of SMS and social media messages and gather information about barriers and facilitators to linkages between SMS and social media and FTF clinic services. IDIs gathered information about KP experience and opinions related to the PACTE-VIH mHealth intervention, as well as barriers to and facilitators of linkages between SMS and social media and FTF clinic services. In addition to KP, key opinion leaders and peer educators participated in IDIs.

## 2.3 Data Analysis Methods and Strategies

The study relied on a methodology that allowed for assessment of the association between exposure to mHealth or social media and specific outcomes. The analysis strategy consisted of comparison between KP who were exposed and those not exposed to various mHealth or social media interventions regarding outreach and linkage to PTC.

### 2.3.1 Data analysis techniques

Quantitative data analysis included chi-square test and logistic regression models using Stata13 (StataCorp, 2013). Qualitative data analysis encompassed inductive and deductive coding techniques.

The chi-Square test is used to assess a significant relationship between two nominal (categorical) variables. The frequency of the dependent variable is compared with different values of the independent variable. For this OR, the frequency of having “high, intermediate or low knowledge” or “visiting a Drop in Center (DIC)” or “having HIV test regularly”; or “linked to treatment”; or “linkage to PTC” is compared respectively with the exposure or not to the HIV-related SMS and exposure or not to the HIV-related social media. Summary tables and graphs present key results by type of PACTE-VIH message received, SMS (for each KP) and social media (for MSM).

Logistic regression models include the binary or binomial logistic regression models and the multinomial logistic regression models. A binary logistic regression is applied when the dependent variable is dichotomous (binary). This model explains the relationship between one dependent dummy variable and one or more nominal, ordinal, interval or ratio-level independent variables. For the present OR, the binary logistic models assess the relationship between the following dependent variables: use of DIC services, regular HIV testing; use of treatment/care services; and linkage to PTC; and the independent variables: exposure to HIV-related SMS for each KP and exposure to HIV-related social media for MSM; as well as the selected socio-economic covariates (age, marital status, education, possession of mobile phone/ smartphone and computer). The model displays the odds ratio (OR), reporting the chance that an outcome will occur given a particular exposure, compared to the risk of the outcome occurring in the absence of that exposure (reference category). The model displays also the standard errors; P-value and 95% confidence intervals.

The multinomial logistic regression, also called polytomous regression, is applied when the dependent variable is nominal or categorical with more than two categories. For this OR, the level of HIV-related knowledge has three categories (low, intermediate and high). The model predicts the probabilities of the different possible outcomes of a categorically distributed dependent variable, given a set of independent variables. The model allows the choice of K alternatives (three in this case) to be modeled as a set of K-1 independent binary choices ((3-1=2 in this case), in which one alternative is chosen as a "reference" and the other K-1 (3-1=2) compared with the reference category. For this OR, intermediate HIV-related knowledge is chosen as reference for MSM (category with the highest number of cases), whereas low and high HIV-related knowledge are compared with it. Low HIV-related knowledge (category with the highest number of cases) is chosen as reference for FSWs, whereas intermediate and high HIV-related knowledge are compared with it. A multinomial model displays the relative risk ratio (RRR) or exponential ( $\beta$ ) for the K-1 (3-1=2) categories. It corresponds with the odds ratio in the binomial model. Like binomial logistic regression, this model displays the standard errors; P-value and 95% confidence intervals. Interpretation of odds ratio and RRR is similar. An odd ratio or RRR below 1 (0.00-0.99) assumes that the chance for the event to occur in the given categories is low compared to the reference category (risk or chance=1). In contrast, an odds ratio or RRR greater than 1 corresponds to higher risk compared to the reference category. Nevertheless, all statistical analyses are interpreted at 95% confidence interval (CI) or p-value <0.05. Otherwise, the differences are not significant.

The qualitative component of the OR used thematic analysis to examine FGD and Key Informant Interviews (KIIs) or In-depth Interviews (IDI) data, including inductive and deductive coding techniques. Data reduction consisted of coding the most central themes, followed by a systematic analysis of related themes using coding matrices to identify relationships. To reduce threats to validity, data analysis strategies encompassed a triangulation approach. It consisted of comparison of findings from different data sources (qualitative and quantitative) to evaluate the extent to which evidence converges. In addition, this strategy allows for identifying consistencies and/or inconsistencies with the underlying theoretical models and evidence from literature.

### 2.3.2 Data analysis strategies

Data analysis reposes on four strategies: bivariate analysis, stratification, multivariate models and triangulation. Analyses are performed separately by KP type (MSM and FSWs).

Bivariate analysis consisted of assessing the relationship between each independent variable and each dependent variable using interpretation of proportion and statistics tests. In this case, statistics tests include chi-square and odds ratio (binary logistic regression models) and relative risk ratio (multinomial logistic regression models). Odds ratio and relative risk ratio from bivariate analysis represent crude effect. The relative risk or risk ratio (RR) is the ratio of the probability of an event occurring (for example, exposure to HIV-related message, use of DIC services, preventive behavior, treatment/care, etc.) in an exposed group to the probability of the event occurring in a group not exposed. A RR below 100 (0.00%-99.9%) assumes that the chance for the event to occur in the exposed group is low, compared to the group not exposed. In contrast, a RR greater than 100.0% corresponds to higher prevalence in the exposed group compared to the group not exposed. A RR around 100% reports an absence of difference between an exposed group and a group not exposed.

Stratification is a strategy, which consists of introducing a third variable in the cross-tabulation analysis. The analysis is performed by the homogeneous population subgroups. This strategy allows for assessing whether the initial relationship between the independent variable and the dependent variable is observed in the different sub-groups using chi-square, relative risk and interpretation of proportions. If the introduction of the selected variable changes the initial relationship between the independent and dependent variables, the control factor is called mediating variable. If the initial relationship does not change, the covariate is called moderator variable. Stratification is a first step to multivariate analysis.

For this OR, multivariate analyses aimed to assess the net effect of exposure to the PACTE-VIH ICT (SMS or social media) messages on HIV-related knowledge, HIV preventive behavior and linkage to HIV services. It consists of introducing all selected socio-economic covariates in the models. If the initial relationship remains significant in the multivariate models, findings suggest the absence of mediating factors. On the contrary, if the initial association disappears in the multivariate models, covariates with significant effect on the outcome are considered as mediating factors through which the independent variable influences the dependent variable. Odds ratio and relative risk ratio from multivariate models represent the net effect.

Triangulation consisted of cross checking the consistency of findings generated by different data collection methods (quantitative versus qualitative). This strategy allows for elucidating complementary aspects of the same phenomenon.

## 2.4 Study Limitations

As is the case in all other studies, this OR presents some limitations, among which is the sampling process. Indeed, the study used a purposive sample of KP because the entirety of these populations is not fully understood in Lomé. In addition, the PACTE-VIH database included only a limited number of KPs. Therefore, the only way to access KP was through peer educators who worked for organizations serving KP. Though E4D used the PACTE-VIH programmatic data to compare and contrast results from the OR, the samples drawn from the two datasets may not be comparable in some instances, as the PACTE-VIH programmatic data represented the entire country of Togo, while the E4D OR comprised only KP in Lomé, the capital city. Furthermore, some KPs may not be in the PACTE-VIH database.

## 2.5 Ethical Considerations

The ethical considerations of this operations research comprised three steps. First, the research protocol was approved by the University of California, Berkeley Center for Protection of Human Subjects (CPHS #2016-03-8583) early March 2016. Second, USAID/WA approved the entire protocol and its annexes at the end of March 2016. Last, the Togolese

Ethical Committee “Comité de Bioéthique pour la Recherche en Santé” of the Ministry of Health and Social Protection provided the Ethical approval (AVIS N° 19/2015/CBRS) of the French version of the protocol on June 30, 2016.

### **Box I – Summary**

*This section describes data and methods used in this study. The study relies on quantitative and qualitative data. Analyses are based on three types of variables: (1) two independent variables: exposure to the PACTE-VIH HIV-related SMS for each KP type and exposure to the PACTE-VIH HIV related social media messages for MSM; (2) Dependent variables include HIV-related level of knowledge, use of DIC services, HIV regular testing, linkage to treatment/care, and linkage to PTC. Quantitative data comprise information from 503 MSM and 502 FSWs. The quantitative questionnaire allowed capturing the following information: characteristics of the key populations, use of technology; HIV knowledge, testing and services, enrollment in program, experiences with and opinions about HIV messages via SMS and/or social media. Qualitative data includes 12 Key Informants interviews (12) with MSM and 13 KII with FSWs as well as five Focus Groups Discussions (FGDs) among which three with MSM and 2 with FSWs. Quantitative data analysis methods encompass chi-square and logistic regression models, whereas qualitative data analysis consists of content and thematic analyses. Data analysis strategies comprised bivariate analysis, stratification, multivariate and triangulation. All analyses are performed separately by KP type (MSM and FSW).*

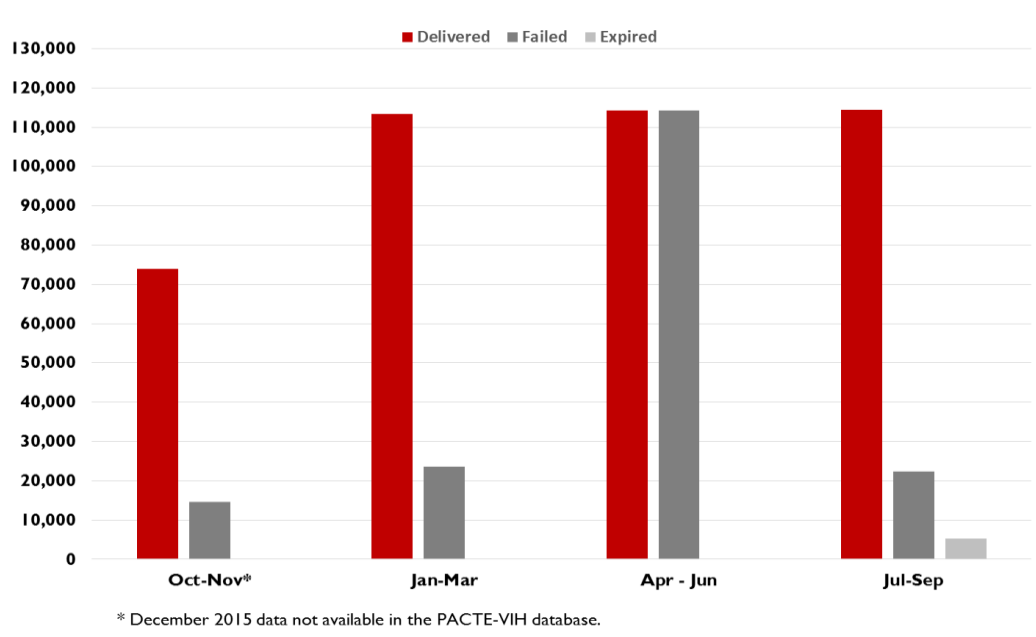
### 3. EXPOSURE TO THE PACTE VIH HIV-RELATED SMS

Existing literature highlights the potential role of Information and Communication Technology (ICT) in HIV prevention, treatment and care (Sheoran et al., 2014; USAID, 2014). The use of mHealth allows for increased knowledge and the use of health services, including preventive and curative (Sheoran et al., 2014; USAID, 2014). This section reports KPs' exposure to the PACTE VIH HIV-related SMS and its association with the use of HIV services in Lomé. Analyses relied on the PACTE VIH FY4 (October 2015-September 2016) program data and the 2016 OR quantitative and qualitative data. Overall, 43.5% of MSM and 9.6% of FSWs were exposed to the PACTE-VIH HIV-related SMS. Exposure to the PACT-VIH SMS program was associated with high use of the HIV services regardless of the KP category.

#### 3.1 PACTE-VIH HIV-related SMS delivered

Overall in Togo, the PACTE-VIH SMS platform contained 257 MSM and 380 FSWs. The PACTE-VIH project sent one lifeline message every day targeting people living with HIV (PLHIV) and two healthy living messages to everyone enrolled each week. Figure 3 illustrates the number of SMS delivered, failed and expired. Each month, the Project was sending a total of 40,000 messages to KP enrolled. Out of those messages, according to the PACTE-VIH database, approximately 8,000 failed to go through consistently each month because the phone numbers were inactive.

**Figure 3 – Number of SMS messages delivered, failed and expired in Togo by quarter, October 2015-September 2016**



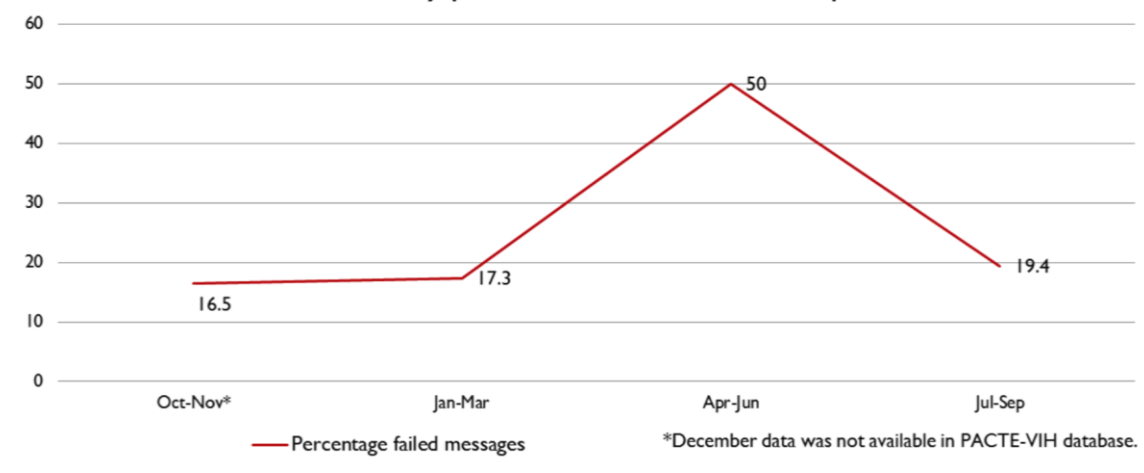
*Source: PACTE-VIH reports October 2015 – September 2016.*

Figure 2 reveals consistent numbers of delivered and failed messages over the study period<sup>1</sup> (October 2015-October 2016). This justifies the low number of delivered messages in the first quarter of FY4 (September-December 2015). Furthermore, Figure 2 reveals high number of failed messages during the third quarter of FY4 (April-June 2016).

<sup>1</sup>

Similarly, Figure 4 shows that 50% of messages sent during the third quarter of FY4 failed. Message failures or expiration may represent the combination of failures/expiration from previous months that were not removed and new failures from numbers added each month.

**Figure 4 - Proportion of SMS messages failed or expired in Togo, October 2015 and September 2016 (PACTE-VIH database)**



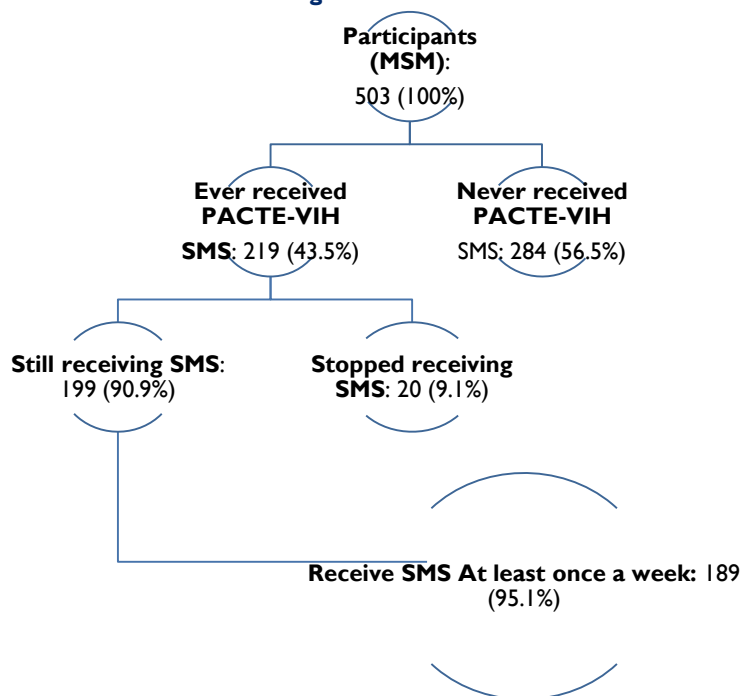
These data are consistent with findings from the 2016 E4D quantitative survey, which indicated that the majority of MSM (70%) received their first HIV-related SMS from PACTE-VIH in 2014 (35%) and in 2015 (34%). Similarly, 39% of FSW reported receiving their first SMS message in 2015. In 2016, which comprises most of FY4 of PACTE-VIH database, only 27% of FSWs and 13% of MSM received their first message.

### **3.1.1 Exposure to PACTE-VIH HIV-related SMS among MSM**

Data from the 2016 survey (Figure 5a) show 43.5% of MSM were exposed to the PACTE-VIH HIV-related SMS. Out of the total of 219 MSM exposed to the PACTE-VIH HIV-related SMS, 91% were still receiving messages at the time of the survey. Furthermore, 95% of MSM exposed to the PACTE-VIH HIV-related SMS at the time of the study reported receiving SMS at least once a week.



**Figure 5A – Exposure to PACTE-VIH HIV-related SMS among MSM**



A UIC was essentially the gatekeeper to potentially receiving messages. Thus, the main barrier for not receiving messages was not having the UIC. The MSM who had never received messages were probably never enrolled in the PACTE-VIH program, which means they did not receive a unique identification code (UIC). Other less prevalent barriers included not having a phone and/or not using SMS on the phone.

Data from qualitative survey showed that many MSM seemed to have refused to get a UIC. Despite not having one, they were still able to get information and services at the DIC and also at the different venues where testing activities were offered. Indeed, enrollment to the PACTE-VIH database and receiving a UIC were not a condition for KP to visit a DIC. Those who received a UIC understood the benefits of it, mostly noting confidentiality, and thought that MSM who refused the code did so due to a misunderstanding of its importance. This issue is best described below by one of the participants.

*"I think these people are not sufficiently informed about the code and therefore do not really know what it is and its purpose. I think they will understand when they are told. I think the code is better. Those who refuse the code, what will they want to replace it with? It's only the code that can be assigned to them ... I think these people did not understand the function of the code. Perhaps, through explanations, they can agree to have it". (Interviewee #6)*

Qualitative data also showed that some MSM did not want to receive SMS messages. Although that was not clear in the survey responses, during FGDs, some MSM mentioned not wanting to receive SMS HIV related messages with explanations such as the one below.

*"My cell phone isn't password protected, for example, if someone in my family is holding the cell phone and this kind of message arrives, and if he asks me questions, I will not know what to say. That's why I say that, for now, I do not want to receive these messages". (MSM focus group participant).*

This result is consistent with the 2015 PACTE-VIH midterm evaluation findings, which reported internal barriers indirectly influencing access to public facilities. Indeed, the unwillingness of KPs to reveal their sexual orientation and practices

constitutes an important internal barrier (IBTCI, 2015). Similarly, findings from Key Informant Interviews (KII) with stakeholders reported that the context of stigma and discrimination was a major obstacle to achieving the overall goal of PACTE-VIH (IBTCI, 2015).

Among the MSM who had ever received HIV-related messages via SMS, those who stopped receiving messages attributed it to a loss of phone or change of SIM card. Interestingly, some MSM who received SMS messages did so without having a UIC because a peer educator had initiated the outreach. Although they found the messages useful, they were surprised to receive them.

*“...The first time I received the SMS, I panicked a little because I never imagined that someone could send me this kind of message [...]. The fact that a lot of friends around me received the same message convinced me about the existence of a program targeting KP”* (MSM Focus group participant)

Table 3A reports socio-economic factors associated with exposure to the PACTE-VIH HIV-related SMS in Lomé. In general (among MSM and FSW), exposure to SMS is statistically associated with all selected variables except KP's age. Access to the PACTE-VIH HIV-related SMS is higher among unmarried KP, the most educated KP and population owning a smartphone and/or a computer. Table 3A shows that exposure to the PACTE-VIH SMS is statistically associated with age, ownership of a smartphone and possession of a computer among MSM.

**Table 3A – Socio-economics factors associated with PACTE-VIH HIV-related SMS among MSM in Lomé**

	Bivariate analysis (chi-square)			Multivariate logistic regression			
				95% Confidence Interval (CI)			
	%	N	Chi-square	Odd-ratio	P>z	Low	Up
<b>Age</b>							
<25	36.8	223	10.6043**	Reference			
25-29	44.5	164		1.353	0.168	0.880	2.155
30&+	55.2	116		2.309	0.001	1.405	2.016
<b>Marital status</b>							
Not in union	43.4	456	0.0275	Reference			
In union	44.7	47		0.737	0.370	0.378	1.437
<b>Education</b>							
Less than secondary	32.7	55	2.9363	Reference			
Secondary&+	44.9	448		1.254	0.487	0.662	2.376
<b>Has smartphone</b>							
No	29.3	164	20.1587**	Reference			
Yes	50.4	339		2.297	0.000	1.513	3.488
<b>Has Computer</b>							
No	40.2	358	5.5527**	Reference			
Yes	51.7	145		1.301	0.215	0.858	1.972
<b>Total</b>	43.5	503					

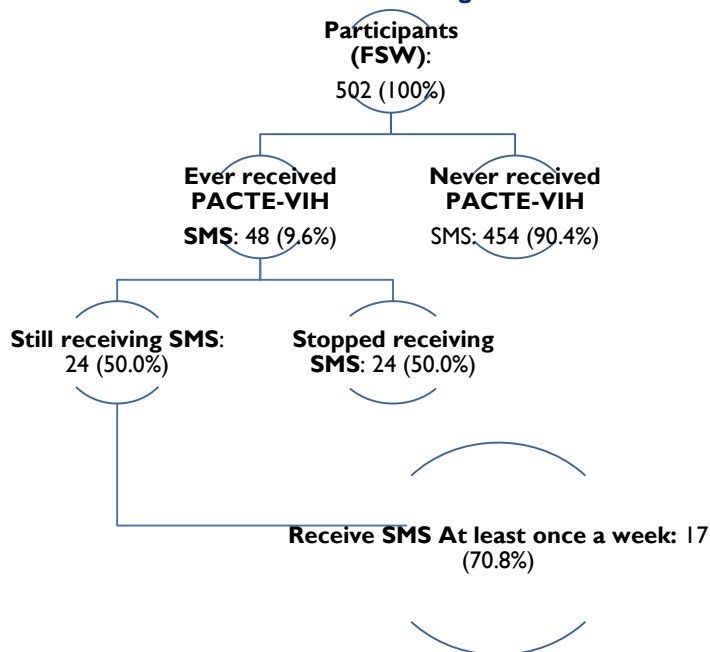
The proportion of MSM who ever received PACTE-VIH SMS increased regularly from 37% among adolescents and young people (aged less than 25 ) to 55% among MSM aged 30 and above. MSM possessing a smartphone (50%) and those owning a computer (52%) were more exposed to PACTE-VIH SMS, compared to others.

Findings from logistic regression support those from bivariate analysis. The likelihood of exposure to the PACTE-VIH HIV-related SMS increased with MSM age, ownership of a smartphone and possession of a computer. In other words, non-mentioned categories constitute a socio-economic barrier to the PACTE-VIH HIV-related SMS exposure. It is worth noting that findings from qualitative survey (KIIs) are consistent with those from quantitative data.

### 3.1.2 Exposure to PACTE-VIH HIV-related SMS among FSWs

Figure 5B illustrates exposure to the PACTE-VIH HIV-related SMS among FSWs in Lomé. Overall, 10% of FSWs were exposed to the PACTE-VIH HIV-related SMS. During the E4D 2016 OR study, half (50%) of the 48 exposed to the program were still receiving the PACTE-VIH HIV-related SMS among whom the large majority (71%) reported receiving at least one SMS per week. Furthermore, all the FSWs receiving the PACTE-VIH HIV-related SMS found the messages very useful.

**Figure 5B – Exposure to PACTE-VIH HIV-related SMS among FSWs**



Similar to what was found among the MSM, qualitative data showed that losing a phone or changing the SIM card was a barrier to continuing to receive SMS messages among FSWs. Not having a phone and not using SMS on their phone were also identified as key barriers to being reached by SMS HIV-related messages. These were barriers reported during the survey. However, another important barrier that emerged in the qualitative analysis was low literacy among FSWs. Indeed, even among those who could read, they could not necessarily read the language, that is French, in which messages were sent. In the E4D OR sample, FSWs were less educated than MSM, and many were from the countryside and spoke local languages, or were from other countries and spoke English as their preferred language.

However, contrary to MSM, there are no significant socio-economic differences in exposure to the PACTE-VIH HIV-related SMS among FSWs (Table 3b).

**Table 3B – Socio-economics factors associated with SMS among FSWs in Lomé**

	Female Sex Workers		
	%	N	Chi-square
<b>Age</b>			
<25	6.1	163	3.7328
25-29	10.0	150	
30&+	12.2	189	
<b>Marital status</b>			
Not in union	9.9	395	0.2082
In union	8.4	107	
<b>Education</b>			
Less than secondary	7.3	273	3.5207
Secondary&+	12.3	228	

	Female Sex Workers		
	%	N	Chi-square
<b>Has smartphone</b>			
No	9.3	378	0.1619
Yes	10.5	124	
<b>Has Computer</b>			
No	9.9	483	2.0878
Yes	(0.0)	19	
Total	9.6	502	

### Box II – Summary

*This section aims to measure KPs exposure to the PACTE-VIH HIV-related SMS and to identify potential barriers and facilitating factors. Analyses rely on bivariate chi-square test and multiple logistic regression models for quantitative data. Qualitative analysis consisted of content and thematic analyses. Overall, MSM were more exposed to the PACTE-VIH HIV-related SMS (43.5%) than FSWs (9.6%). Findings from quantitative analyses are consistent with those from KIs, especially for MSM. MSM owning a mobile phone and/or a computer and those aged 25 or above are more exposed to the PACTE-VIH HIV-related SMS. In contrast, belonging to other categories (less than 25 years, not possessing a mobile phone or a computer) constitutes a socio-economic barrier to the PACTE-VIH HIV-related SMS. Though qualitative analysis highlighted that lack of mobile phone was the major barrier to the PACTE-VIH HIV-related SMS, results from quantitative data did not support that evidence due probably to small numbers.*

## 3.2 PACTE-VIH HIV-related SMS and HIV Knowledge

One of the objectives of HIV-related SMS is to increase HIV knowledge. This section assesses SMS exposure differences in HIV knowledge among the KPs in Lomé. The knowledge indicator is a composite measure created from answers pertaining to methods to reduce the risk of HIV infection and transmission; HIV testing locations; where to receive HIV treatment and medications; and where to find other related services using principal component analysis (PCA). The variable knowledge has three categories: “low”, “intermediate” and “high”. Analyses relied on chi-square test and logistic regression model. Analytical strategies include bivariate, stratification and multivariate. The bivariate models show the crude association between the exposure variable and knowledge. The stratification and multivariate analyses provide the net effect of exposure and allow for identifying mediating and moderating factors.

### 3.2.1 PACTE-VIH HIV-related SMS and HIV knowledge among MSM

Figure 6 depicts the proportion of MSM by the level of HIV-related knowledge according to their exposure to the PACTE-VIH HIV-related SMS. Overall, 33% of MSM had low level of HIV knowledge, whereas 26% reported high level of HIV knowledge. High HIV-related level of knowledge is more frequent among the MSM exposed to SMS (33%), compared to MSM who were not exposed (20%). The difference is statistically significant at  $p < 0.05$ .

**Figure 6 – Distribution of MSM by level of HIV-related knowledge according to their exposure to SMS**

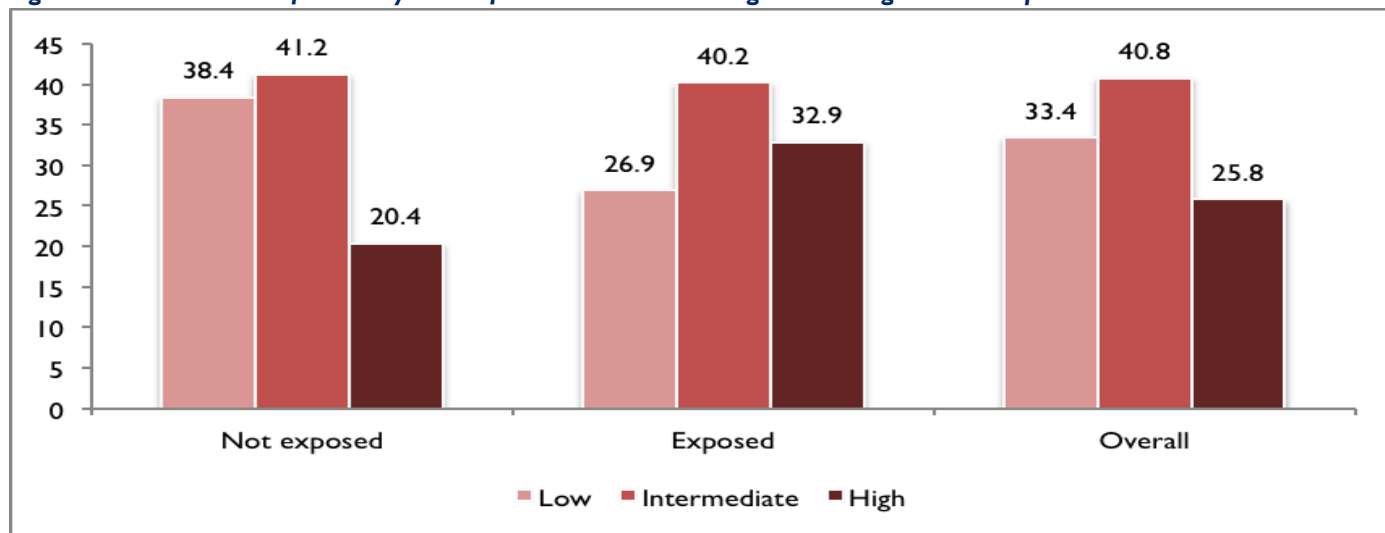


Table 4 presents findings of analysis by strata. Findings from stratification indicate that the relationship between exposure and knowledge is partially significant after controlling for selected background variables. The knowledge advantage observed among the MSM exposed to HIV-related SMS remains significant among young people (less than 25 years old), unmarried MSM, the most educated MSM, MSM owning a smartphone and those who do not own a computer. In other words, there are no significant knowledge differences between MSM who received SMS and those who did not receive SMS considering MSM aged at least 25., MSM living in union, those without a smartphone and those owning a computer. Nevertheless, the absence of differences should be interpreted with caution because of limited cases in these categories.

Consistent with chi-square test, table 4 also shows that MSM exposed to the PACTE VIH HIV-related SMS had higher relative risk (above 100%) of having high HIV-related knowledge than their counterparts who were not exposed, except for MSM living in union and MSM who do not possess a smartphone.

**Table 4 – Exposure to SMS and HIV knowledge by MSM socio-economic characteristics**

Socio-economic Characteristics	Not Exposed				Exposed				Relative Risk	All				Chi-square
	Low	Interm.	High	N	Low	Interm.	High	N		Low	Interm.	High	N	
<b>Age</b>														
<25	48.9	36.9	14.2	141	32.9	40.2	26.8	82	188.7	43.1	38.1	18.8	223	7.6424**
25-29	27.5	44.0	28.6	91	24.7	41.1	34.3	73	119.9	26.2	42.7	31.1	164	0.6196
30&+	28.9	48.1	23.1	52	21.9	39.1	39.1	64	169.3	25.0	43.1	31.9	116	3.3970
<b>Marital status</b>														
Not in union	39.2	39.5	21.3	258	26.3	37.9	35.9	198	168.5	33.6	38.8	27.6	456	14.1942*
In union	(30.8)	(57.7)	(11.5)	26	(33.3)	(61.9)	(4.8)	21	41.7	31.9	59.6	8.5	47	0.6854
<b>Education</b>														
Less than secondary	40.5	46.0	13.5	37	(38.9)	(44.4)	(16.7)	18	123.7	40.0	45.5	14.6	55	0.0970
Secondary&+	38.1	40.5	21.5	247	25.9	39.8	34.3	201	159.5	32.6	40.2	27.2	448	11.8040**
<b>Own smartphone</b>														
No	39.7	36.2	24.1	116	35.4	43.8	20.8	48	86.3	38.4	38.4	23.2	164	0.8217
Yes	37.5	44.6	17.9	168	24.6	39.2	36.3	171	202.8	31.0	41.9	27.1	339	15.7558**
<b>Own computer</b>														
No	47.2	36.9	15.9	214	34.7	42.4	22.9	144	144.0	42.2	39.1	18.7	358	6.1005**
Yes	11.4	54.3	34.3	70	12.0	36.0	52.0	75	151.6	11.7	44.8	43.5	145	5.3257
Total	38.4	41.2	20.4	284	26.9	40.2	32.9	219	161.3	33.4	40.8	25.8	503	12.2968**
Note: % in parentheses (N<30); ** p-value <0.05														

The multinomial logistic regression models allow for assessing the crude (before introducing covariate factors in the model) and the net effect (after controlling for socio-economic factors) of exposure to HIV-related SMS to the level of knowledge. Tables 5 and 6 present findings from multinomial logistic regression models. The reference category for the dependent variable (HIV knowledge) includes MSM with intermediate knowledge on HIV (category with high proportion of MSM). At bivariate level (table 5), results support differences in HIV knowledge by exposure to the PACTE-VIH SMS reported in table 4. MSM exposed to the PACTE-VIH SMS have 65% more chance (crude effect) of having high knowledge about HIV, compared to those who were not exposed.

**Table 5 – Exposure to SMS and HIV knowledge among MSM in Lomé – Bivariate multinomial logistic model**

	Low knowledge				High knowledge			
	RRR	P-value	95% Confidence Interval		RRR	P-value	95% Confidence Interval	
			Low B.	Up B.			Low B.	Up B.
<b>Exposure</b>								
Not Exposed	1.000	Reference	Reference	Reference	1.000	Reference	Reference	Reference
Exposed	0.720	0.125	0.473	1.096	1.650	0.027	1.060	2.570
<b>Const</b>	0.932	0.595	0.718	1.209	0.496	0.000	0.362	0.679

Notes: \*\* P-value <0.05; RRR: Relative Risk Ratio

In contrast, the effect of exposure to the PACTE-VIH SMS (net effect) is not significant, considering low knowledge about HIV (Table 5 and Table 6). Similarly, the difference between exposed to the PACTE-VIH SMS MSM and their counterparts who were not exposed regarding possession of high HIV-related knowledge disappeared after controlling for the selected socio-economic characteristics (age, marital status, education and ownership of a computer and a smartphone). Therefore, these variables could be considered as mediating factors.

**Table 6 – Exposure to SMS and HIV knowledge among MSM in Lomé – Multivariate multinomial model**

	Low knowledge				High knowledge			
	RRR	P-value	95% Confidence Interval		RRR	P-value	95% Confidence Interval	
			Low B.	Up B.			Low B.	Up B.
<b>Exposure</b>								
Not Exposed								
Exposed	0.812	0.358	0.520	1.266	1.494	0.095	0.933	2.391
<b>Age</b>								
<25								
25-29	0.654	0.094	0.398	1.075	1.349	0.274	0.789	2.307
30&+	0.589	0.083	0.324	1.072	2.106	0.019	1.133	3.916
<b>Marital status</b>								
Not in union								
In union	0.855	0.678	0.407	1.794	0.136	0.001	0.044	0.422
<b>Education</b>								
< Secondary								
Secondary & +	1.161	0.655	0.603	2.238	1.691	0.245	0.698	4.098
<b>Smartphone</b>								
No								
Yes	0.893	0.638	0.559	1.429	0.806	0.422	0.476	1.365
<b>Has a computer</b>								
No								
Yes	0.263	0.000	0.144	0.479	2.027	0.005	1.237	3.320
_cons	1.403	0.319	0.721	2.731	0.242	0.002	0.097	0.601

Notes: \*\* P-value <0.05; RRR: Relative Risk Ratio

Among the controlling factors, the age, marital status and computer ownership of MSM are statistically associated with the likelihood of having high HIV knowledge. The chance of having high knowledge is higher among MSM aged more than

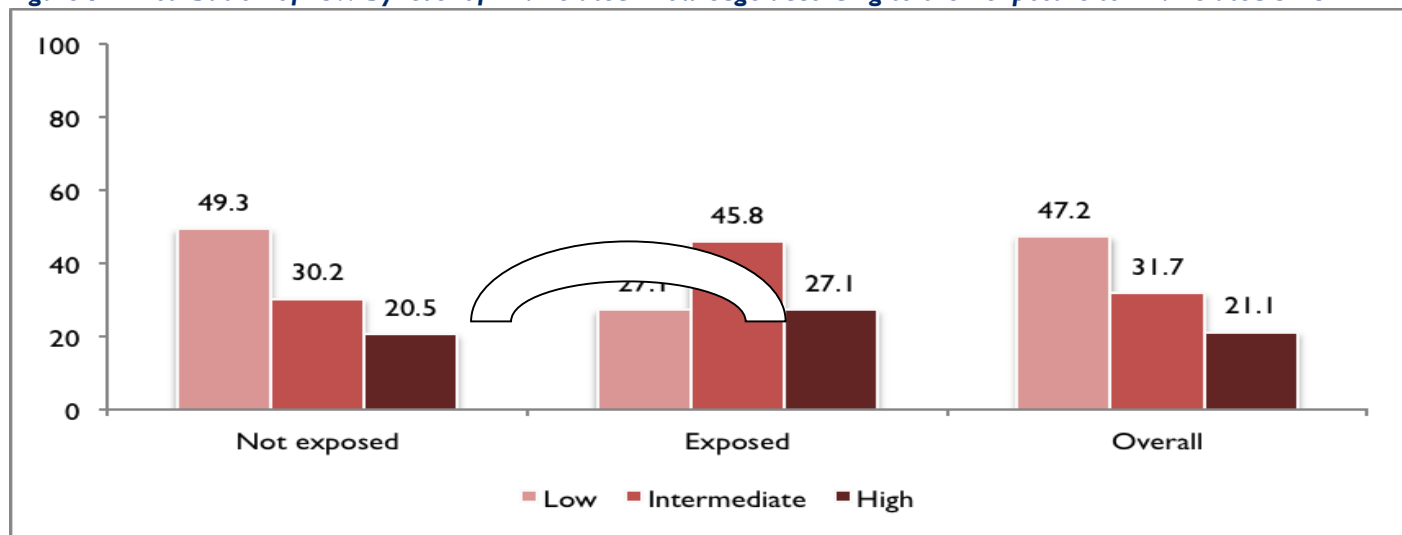
25 who owned a computer. In other words, there are no significant knowledge differences between MSM who received SMS and those who did not receive SMS considering MSM aged at least 25 years and those owning a computer. Table 6 shows also that MSM living in union are less likely to have high knowledge (RRR=0.136, P-value<0.05), compared to unmarried MSM.

In a nutshell, findings from bivariate analyses revealed that exposure to the PACTE-HIV SMS increased the likelihood of MSM to have high HIV knowledge. However, this difference is likely to be mediated by three factors: age, marital status and possession of computer (indicator of high socio-economic status). Indeed, high HIV knowledge is more frequent among older MSM (31%), unmarried MSM (28%) and MSM owning a computer (43%). In parallel, except for computer possession (29%), the majority of MSM belong to those categories. MSM aged more than 25 represented 56% of the sample, whereas 91% of MSM were not living in union.

### 3.2.2 PACTE-VIH HIV-related SMS and HIV knowledge among FSWs

Figure 7 illustrates the proportion of FSWs with low, intermediate and high level of HIV knowledge by exposure to the PACTE-VIH HIV-related SMS. Overall, proportion of FSWs decreases as the level of knowledge increases. It declines from 47% (low knowledge) to 21% (high knowledge). The same trend is observed among those not exposed to HIV-related SMS. In this category, proportion of FSWs diminishes from 49% (low knowledge) to 20% (high knowledge).

**Figure 7 – Distribution of FSW by level of HIV-related knowledge according to their exposure to HIV-related SMS**



In contrast, the distribution of exposed FSWs by the level of HIV related knowledge follows a reversed U-shape. Proportion of low and high knowledge was estimated at 27.1%, whereas 45.8% has intermediate HIV-related knowledge. Figure 6 shows also that exposure to the HIV-related SMS is associated with high HIV-related knowledge (27.1%), compared to those not exposed to the PACTE-VIH HIV-related SMS (20.5%).

Analysis by strata (Table 7) shows that the relationship between exposure to HIV-related SMS and HIV knowledge disappears after controlling for FSW age and marital status. In other words, there is no age specific difference in HIV-related knowledge among FSWs in Lomé. In addition, the difference between FSWs exposed to the PACTE VIH SMS and their counterparts who were not exposed, regarding high HIV knowledge, is not significant among FSWs living in union. However, as stated for MSM, unmarried FSW exposed to the PACTE-VIH related SMS are more likely to have high knowledge about HIV, compared to those who were not exposed. The same trend is observed among the most educated FSWs and those owning a smartphone and/or those who do not own a computer.



Analysis of the relative risk confirms findings from chi-square test and interpretation of proportions. FSWs exposed to messaging are more knowledgeable than their counterparts who were not exposed. FSWs living in union, those aged 25-29, the less educated and those who did not own a smartphone had lower HIV-related knowledge.

**Table 7 –Exposure to SMS and HIV knowledge by FSWs socioeconomics characteristics**

Socio-economics Characteristics	Not Exposed				Exposed				Relative Risk	All				Chi-square
	Low	Interm.	High	N	Low	Interm.	High	N		Low	Interm.	High	N	
<b>Age</b>														
<25	56.2	30.1	13.7	153	(30.0)	(50.0)	(20.0)	10	146.0	54.6	31.3	14.1	163	2.6349
25-29	48.9	31.1	20.0	135	(33.3)	(46.7)	(20.0)	15	100.0	47.3	32.7	20.0	150	1.6901
30&+	43.4	29.5	27.1	166	(21.7)	(43.5)	(34.8)	23	128.4	40.7	31.2	28.0	189	4.0062
<b>Marital status</b>														
Not in union	51.1	29.5	19.4	356	25.6	43.6	30.8	39	158.8	48.6	30.9	20.5	395	9.1793**
In union	42.9	32.7	24.5	98	(33.3)	(55.6)	(11.1)	9	45.3	42.1	34.6	23.4	107	2.0596
<b>Education</b>														
Less than secondary	52.4	29.5	18.1	254	(45.0)	(45.0)	(10.0)	20	55.2	51.8	30.7	17.5	274	2.3378
Secondary&+	45.5	31.0	23.5	200	(14.3)	(46.4)	(39.3)	28	167.2	41.7	32.9	25.4	228	9.9268**
<b>Own smartphone</b>														
No	52.8	29.2	18.1	343	34.3	37.1	28.6	35	158.0	51.1	29.9	19.1	378	4.6399
Yes	38.7	33.3	27.9	111	(7.7)	(69.2)	(23.1)	13	82.8	35.5	37.1	27.4	124	7.3033**
<b>Own computer</b>														
No	49.9	30.3	19.8	435	27.1	45.8	27.1	48	136.9	47.6	31.9	20.5	483	9.1006**
Yes	36.8	26.3	36.8	19	-	-	-	-	-	36.8	26.3	36.8	19	-
Total	49.3	30.2	20.5	454	27.1	45.8	27.1	48	132.2	47.2	31.7	21.1	502	8.8095**

Note: % in parentheses (N<30); \*\* p-value <0.05

The multinomial logistic regression models report the crude and net effect of exposure to HIV-related SMS on the level of HIV-related knowledge. Tables 8 and 9 depict findings from multinomial logistic regression models. Findings from bivariate model (Table 8) confirm those presented in Table 7 (last row). FSWs exposed to the PACTE-VIH HIV-related SMS are more likely to have intermediate (RRR: 2.77, CI: 1.35-5.67) and higher level of HIV knowledge (RRR: 2.41; CI: 1.08-5.39), compared to those who were not exposed.

**Table 8 – Exposure to HIV related SMS and HIV knowledge among FSW in Lomé – Bivariate multinomial logistic model**

	Intermediate knowledge				High knowledge			
	RRR	P-value	95% Confidence Interval		RRR	P-value	95% Confidence Interval	
			Low B.	Up B.			Low B.	Up B.
<b>Exposure</b>								
Not Exposed	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Exposed	2.767	0.005	1.350	5.672	2.409	0.033	1.076	5.392
<b>Const</b>	0.612	0.000	0.494	0.756	0.415	0.000	0.326	0.529

Notes: \*\* P-value <0.05; RRR: Relative Risk Ratio

Table 9 reports findings from multivariate multinomial logistic regression model. As is the case with the bivariate multinomial model, FSW with low level of HIV knowledge represent the reference category because it has the larger number in the sample. Overall, as it is with the bivariate level, exposure to the PACTE-VIH HIV related message is associated with higher and intermediate level of HIV knowledge. However, the difference is not significant, considering HIV high knowledge at multivariate level (RRR: 1.990; CI: 0.866-4.573).

**Table 9 – Exposure to HIV related SMS and HIV knowledge among FSW in Lomé – Multivariate multinomial model**

	Intermediate knowledge				High knowledge			
	RRR	P-value	95% Confidence Interval		RRR	P-value	95% Confidence Interval	
			Low B.	Up B.			Low B.	Up B.
<b>Exposure</b>								
Not Exposed	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Exposed	2.644	0.009	1.277	5.476	1.990	0.105	0.866	4.573
<b>Age</b>								
<25	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
25-29	1.180	0.526	0.707	1.971	1.691	0.108	0.891	3.210
30&+	1.385	0.207	0.835	2.294	3.161	0.000	1.724	5.794
<b>Marital status</b>								
Not in union	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
In union	1.304	0.298	0.791	2.151	1.275	0.406	0.718	2.264
<b>Education</b>								
< Secondary	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Secondary & +	1.206	0.402	0.778	1.871	1.872	0.015	1.127	3.110
<b>Smartphone</b>								
No	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Yes	1.741	0.029	1.058	2.867	1.874	0.028	1.071	3.279
<b>_cons</b>	0.399	0.000	0.257	0.619	0.136	0.000	0.076	0.243

Notes: \*\* P-value <0.05; RRR: Relative Risk Ratio

Among covariates variables, Table 9 shows that FSWs owning a smartphone are more likely to have intermediate knowledge (RRR: 1.74% higher, p-value <0.05) as well as higher HIV knowledge (RRR: 1.87% higher, p-value <0.05) than those who are not exposed to HIV SMS. Similarly, FSW aged 30 (RRR: 3.2), those in union (RRR: 1.3) and those with at least secondary education (RRR: 1.9) have the highest level of HIV knowledge, compared to their counterparts.

### 3.3 PACTE-VIH HIV-related SMS and use of Drop in Centers (DICs)

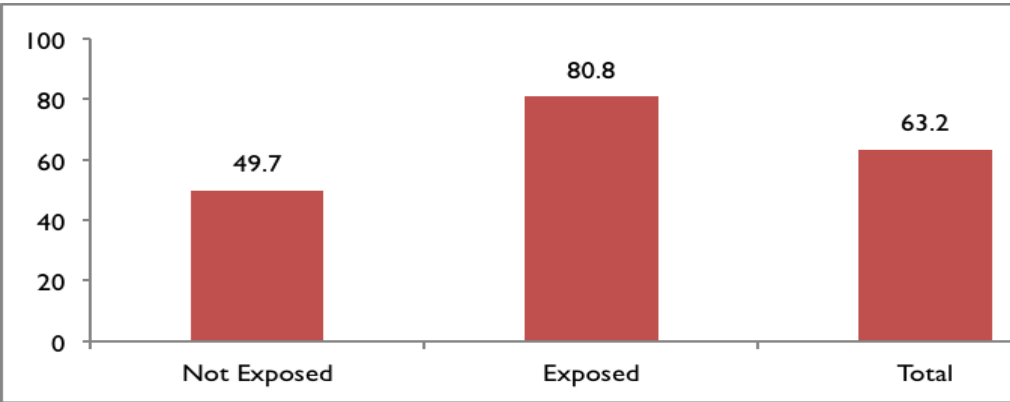
One of the strategies of PACTE-VIH program is the use of mobile phones through SMS to increase the uptake of HIV services. PACTE-VIH drop-in-centers (DICs) offer clinical services and a wide range of associated community-based services, including HIV testing and counseling, and STI services, referrals, peer education outreach activities, social events for KP, psychosocial counseling and support groups, distribution of condoms and lubricants, human rights and Gender-Based Violence awareness and support services as well as income generating-activities. They are friendly environments where key populations can easily access resources and information for risk reduction and HIV prevention free of stigma or discrimination. Peer Educators play key role at DICs through conducting scheduled group and one-on-one sensitivity sessions, providing referrals, and distributing condoms and lubricants. They also host occasional parties at DICs to encourage more (and new) individuals to visit the DICs.

This section reports the association between exposure to the PACTE-VIH HIV-related SMS and the use of DIC services.

#### 3.3.1 PACTE-VIH HIV-related SMS and Use of DIC services among MSM

Figure 8 indicates that overall, 63% of surveyed MSM ever visited a DIC. This proportion is higher (81%) among exposed to HIV-related SMS, compared to those who are not exposed to HIV-related SMS (50%).

Figure 8– Proportion of MSM who have ever used DIC services by exposure to HIV-related SMS



However, it is worth mentioning that data do not allow the establishment of a causal relationship. Indeed, one cannot confirm that it is exposure to SMS that increases the use of DIC, since visiting a DIC could facilitate enrollment to the SMS platform.

Table 10 shows the association between exposure to the PACTE VIH HIV-related SMS and use of DIC services by socio-economic category (stratification analysis).

Table 10 – Exposure to SMS and use of DIC services by MSM socio-economics characteristics

According to these findings, the association between exposure to the HIV-related SMS and use of DIC services remains significant in the majority of socio-economic categories, except among MSM living in union (47 cases in total) and the less

Socio-economics Characteristics	Ever visited PACTE-VIH DIC							
	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	39.0	141	73.2	82	24.2295**	187.7	51.6	223
25-29	58.24	91	82.2	73	10.8435**	141.1	68.9	164
30&+	63.5	52	89.1	64	10.8128**	140.3	77.6	116
<b>Marital status</b>								
Not in union	50.8	258	82.8	198	50.3897**	163.0	64.7	456
In union	38.5	26	61.9	21	2.5550	160.8	48.9	47
<b>Education</b>								
Less than secondary	62.2	37	83.3	18	2.5415	133.9	69.1	55
Secondary&+	47.8	247	80.6	201	50.9424**	168.6	62.5	448
<b>Own smartphone</b>								
No	51.7	116	68.8	48	4.0089**	133.1	56.7	164
Yes	48.2	168	84.2	171	49.1963**	174.7	66.4	339
<b>Own computer</b>								
No	44.9	214	78.5	144	40.0245**	174.8	58.38	358
Yes	64.3	70	85.3	75	8.5942**	132.7	75.2	145
<b>HIV knowledge</b>								
Low	63.3	109	61.0	59	9.1391**	96.4	45.2	168
Intermediate	56.4	117	85.2	88	19.4232 **	151.1	68.8	205
High	60.3	58	91.7	72	18.1836**	152.1	77.7	130
Total	49.7	284	80.8	219	51.6794**	162.6	63.2	503
Note: % in parentheses (N<30); ** p-value <0.05								

educated MSM (55 cases in total). It is possible that limited cases of MSM in these categories influenced the consistency and validity of statistical test. Analysis of relative risk confirms the above results. MSM exposed to the PACTE VIH HIV-related SMS had relative risk above 130% in all categories, except among those who had low HIV knowledge (RR: 96.4) and not statistically significant.

Bivariate and multivariate logistic regression models assess the net effect of exposure to HIV-related SMS on use of DIC services (Table 11). Findings confirm that the likelihood of using DIC is higher among the MSM exposed to HIV-related SMS. Odds ratio is estimated at 4.27 (CI: 2.84-6.43) at bivariate level and at 3.88 (CI: 2.49-6.05) after controlling for socio-economic characteristics. The effect of exposure to the HIV-related SMS on use of DIC services decreased by 9% after controlling for socio-economic factors. However, the net effect remains significant.

**Table 11 – Effects (Crude versus net) of exposure to SMS on use of DIC services among MSM**

	Model 1 – Bivariate					Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI			Odds Ratio (2)	P>z	95% CI		%Change
			Low	Up				Low	Up	
<b>Exposure</b>										
Not Exposed	Reference					Reference				
Exposed	4.274	0.000	2.839	6.434		3.883	0.000	2.491	6.053	-9.1
<b>Age</b>										
<25						Reference				
25-29						1.702	0.028	1.060	2.733	
30&+						3.672	0.000	1.951	6.912	
<b>Marital status</b>										
Not in union						Reference				
In union						0.222	0.000	0.101	0.489	
<b>Education</b>										
< Secondary						Reference				
Secondary & +						0.494	0.050	0.244	1.000	
<b>Smartphone</b>										
No						Reference				
Yes						1.220	0.393	0.773	1.927	
<b>Has a computer</b>										
No						Reference				

Model 1 – Bivariate					Model 2 – Multivariate					
	Odds	P>z	95% CI		Odds	P>z	95% CI		%Change	
	Ratio (1)		Low	Up	Ratio (2)		Low	Up		
Yes	Reference				1.568	0.084	0.941	2.611		
HIV knowledge					Reference	0.000	1.491	3.850		
Low					2.396					
Intermediate					2.730					
High		0.001	1.522	4.896						
_cons	0.986	0.906	0.781	1.244	0.622	0.199	0.302	1.284		

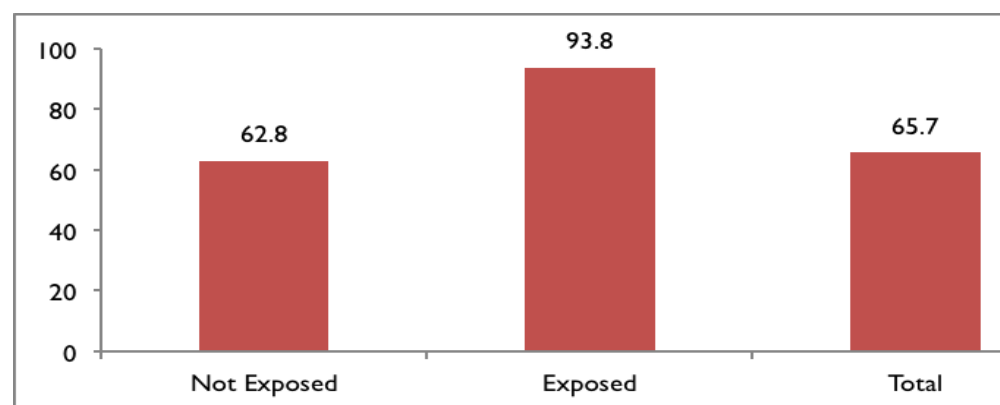
% Change= ((Odds ratio2/Odds ratio1) - (1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

These findings suggest the absence of mediating factors through which exposure to HIV-related SMS is associated with the use of DIC. Considering control factors, Table 11 shows that the likelihood of using the DIC increases with the MSM age. Compared to young MSM aged less than 25, the odds ratio of visiting DIC increases from 1.7 times (CI: 1.06-2.73) for MSM aged 25-29 to 3.7 times (CI: 1.95-6.95) for MSM aged 30 and above. Similarly, the likelihood of visiting the DIC increases with HIV-related knowledge. MSM with intermediate HIV-related knowledge are 2.4 (CI: 1.49-3.85) more times likely to use the DIC services, whereas those with high HIV-related knowledge are 2.7 (CI: 1.52-4.89) more times likely to use DIC services, compared to MSM with low knowledge. Table 11 shows also that MSM living in union are less likely to use the DIC services (OR: 0.22; CI: 0.10-0.49), compared to unmarried MSM. The fear of MSM status disclosure might explain low use of DIC by MSM living in union. Though represented only by 47 people, among whom 45% received the HIV-related SMS, this minority constitutes the most vulnerable group. Their majority have low knowledge and are less likely to use the DIC services.

### 3.3.2 PACTE-VIH HIV-related SMS and use of DIC services among FSWs

Overall, 66% of FSWs ever visited the PACTE-VIH DIC (Figure 9). Similar to MSM, use of DIC services is higher among the FSWs exposed to the PACTE-VIH HIV related SMS (94%), compared to those who never received the PACTE-VIH HIV-related SMS (63%). The 30% difference is statistically significant at p-value <0.05.

**Figure 9 – Proportion of FSWs ever used DIC services by exposure to HIV-related SMS**



Analysis by strata allows for assessing equity in the association between exposure to HIV-related SMS and the use of DIC services as well as to identify potential mediating factors before performing regression models. Table 12 summarizes key findings from stratification. Overall, the relative risk of use of DIC services is estimated at 149% (49% greater) among FSWs exposed to the PACTE VIH HIV-related SMS, compared to their counterparts who were not exposed. This high relative risk is observed in all socio-economic categories (ranging from 121% among the FSWs with high HIV knowledge to 180% among young FSWs aged less than 25).

**Table 12 –Exposure to SMS and use of DIC services by FSW socioeconomics characteristics**

Socio-economics Characteristics	Use of the DIC services							
	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	55.6	153	(100.0)	10	7.6257**	179.9	58.3	163
25-29	65.2	135	(93.3)	15	4.9156**	143.1	68.0	150
30&+	67.5	166	(91.3)	23	5.5039**	135.3	70.4	189
<b>Marital status</b>								
Not in union	61.2	356	94.9	39	17.3799**	155.1	64.6	395
In union	68.4	98	(88.9)	9	1.6560	130.0	70.1	107
<b>Education</b>								
Less than secondary	66.5	254	(100)	20	9.7030**	150.4	69.0	274
Secondary&+	58.0	200	(89.3)	28	10.1877**	154.0	61.8	228
<b>Own smartphone</b>								
No	63.0	343	91.4	35	11.3965**	145.1	65.6	378
Yes	62.2	111	100	13	7.4384**	160.8	66.1	124
<b>Own computer</b>								
No	63.0	435	93.8	48	18.2414**	148.9	66.1	483
Yes	57.9	19	-	-	-		57.9	19
<b>HIV knowledge</b>								
Low	50.0	224	(92.3)	13	8.8161**	184.6	52.3	237
Intermediate	74.5	137	(95.5)	22	4.7737**	128.2	77.4	159
High	76.3	93	(92.3)	13	1.7108	121.0	78.3	106
<b>Total</b>	62.8	454	93.8	48	18.4915**	149.4	65.7	502

Note: % in parentheses (N<30); \*\* p-value <0.05

Overall, the exposure to HIV-related SMS differences in attending the DIC is statistically significant in all socio-economic characteristics, except among FSW living in union and those with high HIV-related knowledge. In these cases, small numbers of people might explain the absence of statistic effect. Table 12 shows also absence of FSWs exposed to HIV-related SMS and owning a computer. Therefore, the variable “ownership of computer” was excluded from the regression model.

Findings from the multivariate logistic model (Table 13) confirm the exposure to HIV-related SMS difference in attending DIC services. FSWs exposed to the PACTE-VIH HIV-related SMS are 8.9 times (CI: 2.7-29.1) more likely to use DIC services, compared to their counterparts. This difference remains significant after controlling for socio-economic characteristics (OR: 6.7; CI: 2.0-22.3).

**Table 13 – Effects (Crude versus net) of exposure to SMS on use of DIC services among FSWs**

Model 1 – Bivariate					Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI		Odds Ratio (2)	P>z	95% CI		%Change
			Low	Up			Low	Up	
Exposure									
Not Exposed	Reference				Reference				
Exposed	8.895	0.000	2.722	29.065	6.678	0.002	2.000	22.302	-24.9
Age									
<25					Reference				
25-29					1.267	0.363	0.761	2.107	
30&+					1.103	0.701	0.668	1.821	
Marital status									
Not in union					Reference				
In union					1.115	0.676	0.670	1.856	
Education									
< Secondary					Reference				
Secondary & +					0.584	0.016	0.377	0.903	
Smartphone									
No					Reference				
Yes					1.144	0.592	0.699	1.872	
HIV knowledge									
Low	Reference				Reference				
Intermediate					4.653	0.000	2.946	7.348	
High					4.875	0.000	2.722	8.733	
cons	1.686	0.000	1.394	2.040	0.722	0.167	0.455	1.146	

% Change= ((Odds ratio2/Odds ratio1) - (1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

Table 13 shows also that the level of education and that of HIV-related knowledge are statistically associated with the use of DIC services. FSWs with secondary education are less likely (OR: 0.58; CI: 0.38-0.90) to use PACTE-VIH services at DIC, compared to those with low education. Consistent with findings from MSM, the likelihood of using DIC services increases with the level of knowledge. Compared to FSW with low HIV-related knowledge, those with intermediate level and the highest level of HIV-related knowledge have about 5 times chance of attending the DIC services.



## Box IV – Summary

This section analyzes the association between exposure to the PACTE-VIH HIV-related SMS and use of DIC services. Analyses rely on bivariate chi-square test at bivariate and by socio-economic strata, and multiple logistic regression model for quantitative data.

Findings from bivariate and multivariate analyses report strong association between exposure to HIV-related SMS and use of DIC services among KPs in Lomé. KPs exposed to HIV-related SMS are more likely than their counterparts to use PACTE-VIH DIC services. The magnitude of the relationship is higher among FSWs (8 times more) than among the MSM (4 times more) after controlling for socio-economic characteristics.

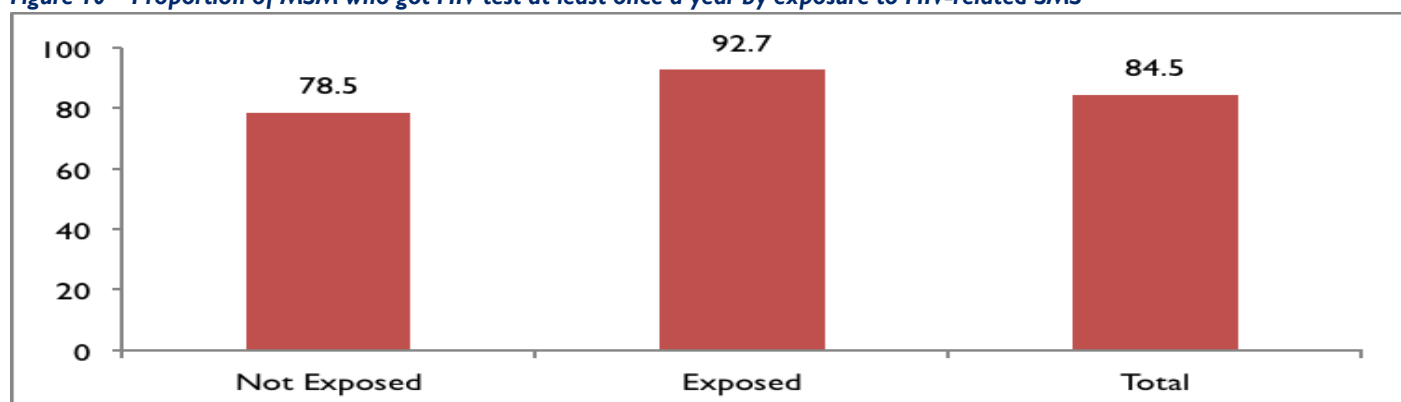
## 3.4 PACTE-VIH HIV-related SMS and the use of Preventive services

One of the UNAIDS objectives targets 90% of HIV positive individuals to be aware of their HIV status. PACTE-VIH HIV-related SMS program is one of the strategies to reach that objective. This section reports the association between exposure to the PACTE-VIH HIV-related SMS and regular HIV testing (at least once a year) among KPs.

### 3.4.1 PACTE-VIH HIV-related SMS and prevention behavior among MSM

Figure 10 depicts proportion of MSM who went for HIV test at least once a year. Overall, 85% reported regular testing for HIV. As for HIV-related knowledge and the use of the DIC services, the proportion of MSM who perform regular HIV test is higher among those exposed to the HIV-related SMS (93%), compared to their counterparts who never received HIV related SMS (79%).

Figure 10 – Proportion of MSM who got HIV test at least once a year by exposure to HIV-related SMS



Analysis per socio-economic category, stratification, confirmed significant association between exposure to the PACTE VIH HIV-related SMS and prevention behavior among the MSM in Lomé (Table 14).

Table 14– Exposure to SMS and regular HIV testing by MSM socio-economic characteristics

Socio-economics Characteristics	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	79.4	141	95.1	82	10.1223**	119.8	85.2	223
25-29	83.5	91	89.0	73	1.0253	106.6	86.0	164
30&+	67.3	52	93.8	64	13.5300**	139.4	81.9	116
<b>Marital status</b>								

Not in union	78.7	258	92.9	198	17.7070**	118.0	84.9	456
In union	76.9	26	90.5	21	1.5108	117.7	83.0	47
<b>Education</b>								
Less than secondary	64.9	37	83.3	18	2.0022	128.4	70.9	55
Secondary&+	80.6	247	93.5	201	15.8384**	116.0	86.4	448
<b>Own smartphone</b>								
No	71.6	116	87.5	48	4.7643**	122.2	76.2	164
Yes	83.3	168	94.2	171	9.9657**	113.1	88.8	339
<b>Own computer</b>								
No	74.8	214	93.1	144	19.6120**	124.5	82.1	358
Yes	90.0	70	92.0	75	0.1774	102.2	145	91.0
<b>HIV knowledge</b>								
Low	82.6	109	100	59	11.5958**	121.1	88.7	168
Intermediate	70.9	117	84.1	88	4.8438**	118.6	76.6	205
High	86.2	58	97.2	72	11.5958**	112.8	92.3	130
<b>Ever visited DIC</b>								
No	71.3	143	88.1	42	4.8851**	123.6	75.1	185
Yes	85.8	141	93.8	177	5.6658**	109.3	90.3	318
Total	78.5	284	92.7	219	19.1580**	118.1	84.7	503
Note: % in parentheses (N<30); ** p-value <0.05								

Indeed, the association between exposure to the HIV-related SMS and regular HIV testing (at least once a year) among the MSM remains statistically significant in all socio-economic categories except among MSM aged 25-29, the less educated MSM, and MSM owning a computer. The persistent association suggests the absence of mediating factors and confirms the potential role of the PACTE-HIV-related SMS in annual HIV testing behavior. Overall, MSM exposed to the PACTE-HIV-related SMS had 18% more chance of getting an HIV test regularly (relative risk: 118%), compared to their counterparts who were not exposed. This high relative risk is observed in all socio-economic categories (ranging from 102% among the MSM owning a computer to 130% among the MSM aged at least 30).

Findings from the regression models (Table 15) confirm persistent effect of HIV-related SMS on the likelihood of regular HIV testing among the MSM in Lomé. MSM exposed to HIV-related SMS were 2.4 more likely to test for HIV compared to their counterpart who never received the HIV-related SMS.

**Table 15 – Effects (Crude versus Net) of exposure to SMS on preventive behavior among MSM**

Model 1 – Bivariate					Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI		Odds Ratio (2)	P>z	95% CI		%Change
			Low	Up			Low	Up	
<b>Exposure</b>	Reference 3.471	0.000	1.938	6.214	Reference	0.006	1.295	4.646	-29.3
Not Exposed					2.453				
Exposed									
<b>Age</b>					Reference				
<25					0.887	0.716	0.466	1.690	
25-29					0.477	0.055	0.224	1.014	
30&+									
<b>Marital status</b>					Reference				
Not in union					1.936	0.206	0.695	5.391	
In union									
<b>Education</b>					Reference				
< Secondary					1.881	0.106	0.875	4.044	
Secondary & +									
<b>Smartphone</b>					Reference				
No					1.848	0.031	1.059	3.223	
Yes									
<b>Computer</b>									
No									
Yes					1.686	0.154	0.822	3.462	

Model 1 – Bivariate					Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI		Odds Ratio (2)	P>z	95% CI		%Change
			Low	Up			Low	Up	
<b>HIV knowledge</b>					Reference				
Low					0.256	0.000	0.135	0.486	
Intermediate					0.854	0.725	0.356	2.051	
High									
<b>Ever visited DIC</b>					Reference				
No					3.213	0.000	1.792	5.762	
Yes									
_cons	3.656	0.000	2.754	4.853	1.826	0.179	0.759	4.390	

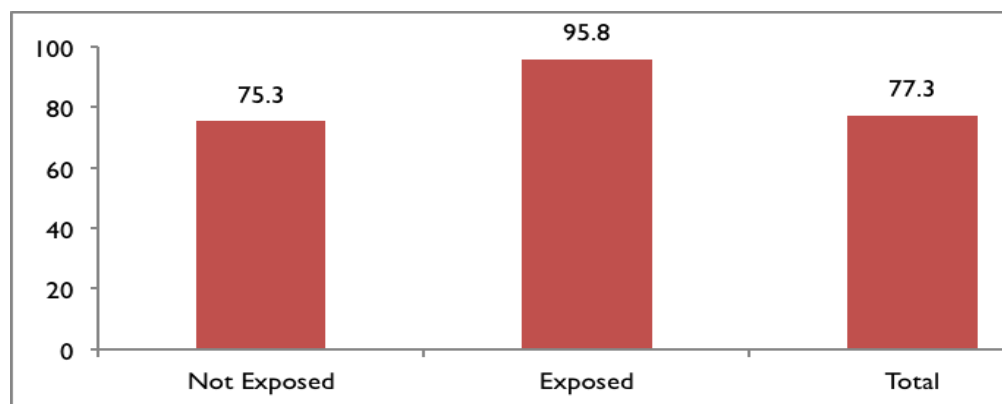
% Change= ((Odds ratio2/Odds ratio1) - (1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

In reference to effects of covariates, Table 15 shows that smartphone ownership, HIV-related knowledge and the use of DIC are statistically associated with preventive behavior. MSM with smartphone (OR: 1.8; CI: 1.06-3.22) and MSM who ever visited a DIC (OR: 3.2; CI: 1.8-5.8) are more likely to go for regular HIV tests.

### 3.4.2 PACTE-VIH HIV-related SMS and Prevention Behavior among FSWs

The large majority of FSWs (77.3%) regularly tested for HIV test (at least once a year) (Figure 11). Similar to that of MSM, the proportion of FSWs who performed regular HIV tests is significantly higher among those exposed to HIV-related SMS (96%), compared to those who never received the HIV-related SMS (75%). Overall, FSWs exposed to the PACTE-HIV-related SMS had 27% more chance of getting HIV test regularly (relative risk: 127%), compared to those who were not exposed to the PACTE-HIV-related SMS.

**Figure 11 – Proportion of FSWs who received HIV test at least once a year by exposure to HIV-related SMS**



Overall, findings from stratification confirm the persistent association between exposure to the HIV-related SMS and regular HIV testing (Table 16). However, the observed difference at bivariate level disappears after controlling for the HIV-related knowledge. Similarly, the socio-economic difference in regular HIV testing is not significant in the following subgroups: (1) FSWs aged less than 25 and those aged at least 30 ; (2) FSWs living in union; (3) FSWs owning smartphone; (4) ever visited a DIC.

**Table 16– Exposure to SMS and preventive behavior by FSW socioeconomics characteristics**

Socio-economics Characteristics	Not Exposed		Exposed		Chi-square	Relative Risk	Overall		
	%	N	%	N			%	N	
<b>Age</b>									
<25	68.6	153	90.0	10	2.0393	131.2	69.9		163
25-29	76.3	135	100	15	4.5198**	131.1	78.7		150

30&+	80.7	166	95.7	23	3.1242	118.6	82.5	189
<b>Marital status</b>								
Not in union	75.0	356	94.9	39	7.8284**	126.5	77.0	395
In union	76.5	98	100	9	2.6906	130.7	78.5	107
<b>Education</b>								
Less than secondary	75.6	254	95.0	20	3.9447**	125.7	77.0	274
Secondary&+	75.0	200	96.4	28	6.4948**	128.5	77.6	228
<b>Own smartphone</b>								
No	73.8	343	94.3	35	7.2654**	127.8	75.7	378
Yes	80.2	111	100	13	3.1323	124.7	82.3	124
<b>Own computer</b>								
No	75.4	435	95.8	48	10.3267**	127.1	77.4	483
Yes	73.7	19	-	-	-	-	73.7	19
<b>HIV knowledge</b>								
Low	68.3	224	(92.3)	13	3.3473	135.1	69.6	237
Intermediate	82.5	137	(95.5)	22	2.4075	115.8	84.3	159
High	81.7	93	100	13	2.8303	122.4	84.0	106
<b>Ever visited DIC</b>								
No	63.9	169	66.7	3	0.0097	104.4	64.0	172
Yes	82.1	285	97.8	45	7.1912**	119.1	84.2	330
Total	75.3	454	95.8	48	10.3967**	127.2	77.3	502
Note: % in parentheses (N<30); ** p-value <0.05								

This high relative risk is observed in all socio-economic categories (ranging from 104% among the FSWs who ever visited a DIC to 135% among the FSWs who had low HIV knowledge) though the difference is not significant, considering FSWs aged at least 30, those owning a smartphone and among all HIV knowledge strata (categories).

These findings suggest that HIV-related knowledge is a mediating factor explaining the difference between FSWs exposed to HIV-related SMS and those who were not exposed.

However, taking into account all variables in one regression model (Table 17), findings revealed absence of mediating factors because the effect of exposure to HIV-related SMS remains significant (OR: 7.7; IC: 2.3-25.6).

**Table 17 – Effects (Crude versus Net) of exposure to SMS on preventive behavior among FSWs**

Model 1 – Bivariate					Model 2 – Multivariate				
	Odds	P>z	95% CI		Odds	P>z	95% CI		%Change
	Ratio (1)		Low	Up	Ratio (2)		Low	Up	
<b>Exposure</b>									
Not Exposed	Reference				Reference				-20.1
Exposed	7.532	0.006	1.799	31.528	6.017	0.015	1.421	25.487	
<b>Age</b>									
<25					Reference				
25-29					1.455	0.166	0.856	2.476	
30&+					1.729	0.045	1.013	2.951	
<b>Marital status</b>									
Not in union					Reference				
In union					0.966	0.900	0.564	1.656	
<b>Education</b>									
< Secondary					Reference				
Secondary & +					0.951	0.831	0.601	1.505	
<b>Smartphone</b>									
No					Reference				
Yes					1.576	0.106	0.907	2.738	
<b>HIV knowledge</b>									
Low					Reference				
Intermediate	Reference				1.904	0.008	1.180	3.075	
High					2.077	0.023	1.105	3.907	
_cons					1.405	0.163	0.872	2.265	

% Change= ((Odds ratio2/Odds ratio1)-(1))\*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

Also, the HIV-related knowledge is the second significant variable. The likelihood of regular HIV testing increases significantly with the HIV-related knowledge. FSWs with intermediate and high HIV-related knowledge are two times more likely to go for HIV testing.

#### **Box V – Summary**

*This section examines the association between exposure to the PACTE-VIH HIV-related SMS and HIV regular testing. Analyses rely on bivariate chi-square analyses at bivariate and by socio-economic category, and multiple logistic regression models for quantitative data. Exposure to HIV-related SMS is statistically associated with HIV regular HIV testing. The likelihood of being regularly tested is estimated at 2.5 for exposed MSM and 7.7 for exposed FSWs, compared to their counterparts who were not exposed to the HIV-related SMS. Among covariates included in the model, KPs with intermediate and high HIV-related knowledge are more likely to perform regularly HIV test.*

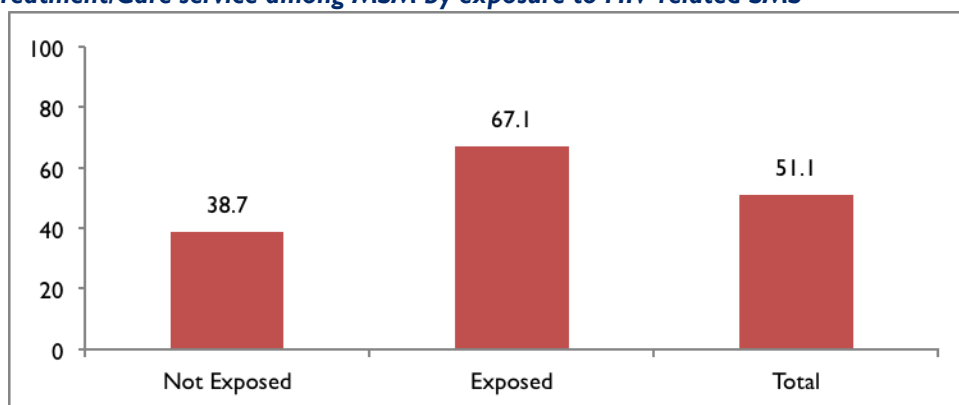
### 3.5 PACTE-VIH HIV-related SMS and use of Treatment/Care services

UNAIDS aims that 90% of people living with HIV be on sustained antiretroviral therapy (ART) by 2020. The PACTE-VIH HIV-related SMS reminds affiliated patients/clients of the importance of treatment and frequency of taking medications. This section assesses the relationship between exposure to the HIV-related SMS and access to care and treatment for any sexual and reproductive health issue (ART and STI).

#### 3.5.1 PACTE-VIH HIV-related SMS and use of treatment/ Care services among MSM

Overall, 51% of MSM reported having ever used treatment services related to sexual and reproductive health, including sexually transmitted infections and HIV regardless of providers (PACTE-VIH or others) (Figure 12).

**Figure 12 – Use of treatment/Care service among MSM by exposure to HIV-related SMS**



As is the case with previous indicators (knowledge, use of DIC services and HIV testing), the use of treatment services is significantly higher among the MSM exposed to the HIV-related SMS (67%) compared to their counterparts who were not exposed to HIV-related SMS (39%).

Table 18 presents findings from stratification analysis (by socio-economic characteristics). In general, the association between exposure to HIV-related SMS and access to treatment/care remains significant after considering the different strata of all socio-economic variables analyzed.

**Table 18– Exposure to SMS and use of treatment/care services by MSM socio-economic characteristics**

Socio-economic Characteristics	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	29.8	141	64.6	82	25.7474***	216.8	42.6	223
25-29	47.3	91	67.1	73	6.4939**	141.9	56.1	164
30&+	48.1	52	70.3	64	5.9276**	146.2	60.3	116
<b>Marital status</b>								
Not in union	39.9	258	69.2	198	38.4958**	173.4	52.6	456
In union	26.9	26	47.6	21	2.1552	177.0	36.2	47
<b>Education</b>								

Less than secondary	51.4	37	55.6	18	0.0859	108.2	52.7	55
Secondary&+	36.8	247	68.2	201	43.4887**	185.3	50.9	448
<b>Own smartphone</b>								
No	38.8	116	50.0	48	1.7496	128.9	42.1	164
Yes	38.7	168	71.9	171	37.9031**	185.8	55.5	339
<b>Own computer</b>								
No	34.1	214	61.8	144	26.6465**	181.2	45.3	358
Yes	52.9	70	77.3	75	9.6011**	146.1	65.5	145
<b>HIV knowledge</b>								
Low	20.2	109	33.9	59	3.8401**	167.8	25.0	168
Intermediate	48.7	117	73.9	88	13.1799**	151.7	59.5	205
High	53.5	58	86.1	72	16.8317**	160.9	71.5	130
Total	38.7	284	67.1	219	39.8860**	173.4	51.1	503

Note: % in parentheses (N<30); \*\* p-value <0.05

The relative risk of getting treatment/ care is 73% higher (relative risk=173%) among MSM exposed to HIV-related SMS, compared to their counterparts who were not exposed. This indicator remains high for the exposed to HIV related SMS in all categories (ranging from 129% among the MSM owning a smartphone to 217% among MSM aged less than 25). However, the difference ceases to be significant in the following cases: (1) MSM living in union; (2) MSM with the lowest education (lower than secondary education); and MSM who do not own a smartphone.

Findings from multivariate logistic regression confirm the association between exposure to HIV-related SMS and use of treatment/care services (Table 19). The use of treatment services is 2.9 times higher among the MSM exposed to HIV-related SMS, compared to those who never received these messages. The difference remains significant in the bivariate and multivariate models, suggesting absence of mediating factors.

**Table 19 – Effects (Crude versus Net) of exposure to SMS on Treatment/Care among MSM**

	Model 1 – Bivariate				Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI		Odds Ratio (2)	P>z	95% CI		%Change
<b>Exposure</b>									
Not Exposed	Reference				Reference				
Exposed	3.230	0.000	2.232	4.673	2.867	0.000	1.896	4.334	-11.2
<b>Age</b>									
<25					Reference				
25-29					1.270	0.315	0.797	2.025	
30&+					1.842	0.035	1.045	3.246	
<b>Marital status</b>									
Not in union					Reference				
In union					0.307	0.003	0.142	0.666	
<b>Education</b>									
< Secondary					Reference				
Secondary & +					0.529	0.065	0.269	1.040	
<b>Smartphone</b>									
No					Reference				
Yes					1.444	0.110	0.920	2.266	
<b>Computer</b>									
No									
Yes					1.438	0.134	0.894	2.315	
<b>HIV knowledge</b>									
Low					Reference				
Intermediate					4.307	0.000	2.660	6.974	
High					5.733	0.000	3.244	10.132	
_cons	0.632	0.000	0.498	0.803	0.256	0.000	0.125	0.525	

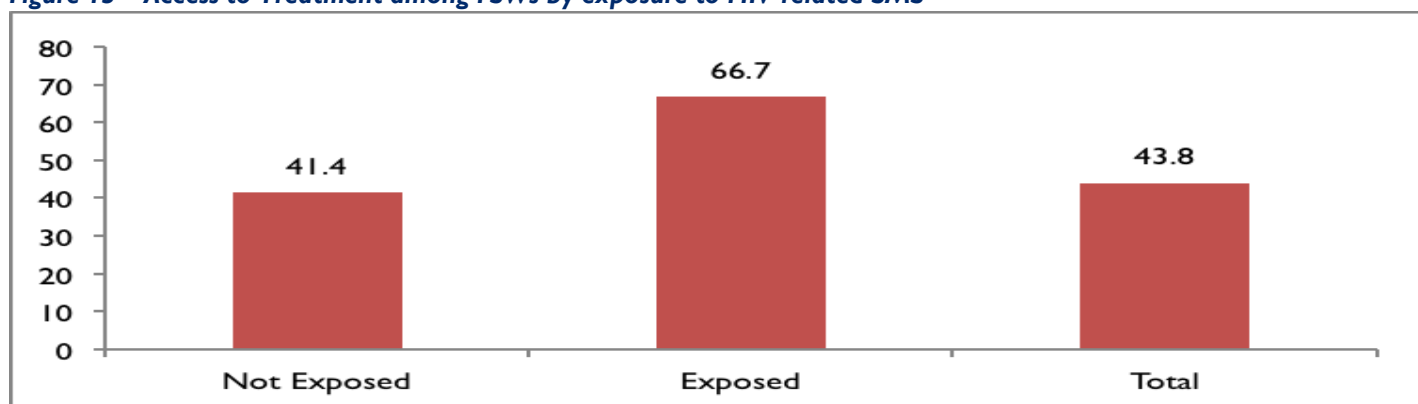
% Change= ((Odds ratio2/Odds ratio1) - (1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

Considering the effect of covariates, the likelihood of using the treatment/care services is higher among MSM aged 30 and above and those with intermediate and high HIV-related knowledge. By contrast, the likelihood of using the treatment/care services is low among MSM living in union (OR: 0.3; CI: 0.1-0.6), compared to unmarried MSM.

### 3.5.2 PACTE-VIH HIV-related SMS and Use of Treatment/ Care Services among FSWs

Less than half of FSWs surveyed (44%) have ever used the treatment and care services. This proportion is significantly higher among FSWs exposed to PACTE-VIH HIV-related SMS (67%), compared to their counterparts who were not exposed (41%). The relative risk of getting treatment/care is 60% higher (RR=161%) among the FSWs exposed to the PACTE VIH HIV-related program, compared to those not exposed.

**Figure 13 – Access to Treatment among FSWs by exposure to HIV-related SMS**



Analysis by socio-economic category (Table 20) revealed that the relationship between the exposure to HIV-related SMS and the use of treatment/ care services remains partially significant after controlling for covariates. The advantage of FSWs exposed to SMS in the use of treatment and care services remains significant for some categories of socio-economic covariates, including FSWs aged less than 30, not living in union, attended at least secondary school, not owning a smartphone and having high HIV related knowledge. Nevertheless, the relative risk of getting treatment/care is higher among the exposed to HIV-related SMS FSWs, compared to those not exposed, regardless of socio-economic category (>120%).

**Table 20– Exposure to SMS and use of Treatment/Care services by FSWs socio-economic characteristics**

Socio-economic Characteristics	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	34.6	153	70.0	10	5.0455**	202.3	36.8	163
25-29	41.5	135	73.3	15	5.5416**	176.6	44.7	150
30&+	47.6	166	60.9	23	1.4252	127.9	49.2	189
<b>Marital status</b>								
Not in union	42.4	356	69.2	39	10.2091**	163.2	45.1	395
In union	37.8	98	55.6	9	1.0953	147.1	39.3	107
<b>Education</b>								
Less than secondary	43.3	254	60.0	20	2.0916	138.6	44.5	274
Secondary&+	39.0	200	71.4	28	10.5392**	183.1	43.0	228
<b>Own smartphone</b>								
No	40.5	343	71.4	35	12.3487**	176.3	43.4	378
Yes	44.1	111	53.9	13	0.4423	122.2	45.2	124
<b>Own computer</b>								



No	40.9	435	66.7	48	11.6615**	163.1	43.5	483
Yes	52.6	19	-	-	-	-	52.6	19
<b>HIV knowledge</b>								
Low	28.6	224	(38.5)	13	0.5823	134.6	29.1	237
Intermediate	52.6	137	(68.2)	22	1.8683	129.7	54.7	159
High	55.9	93	(92.3)	13	6.3147**	165.1	60.4	106
Total	41.4	454	66.7	48	11.2484**	161.1	43.8	502
<b>Note:</b> % in parentheses (N<30); ** p-value <0.05								

These findings suggest absence of mediating factors and moderating role of all covariates in inflating or reducing the association between exposure to HIV-related SMS and the use of treatment/care services. Indeed, though the association is statistically significant in all variables, the relationship disappears in some categories.

Findings from the multivariate logistic regression confirmed the persistent effect of exposure to HIV-related SMS on the use of treatment and care services among FSWs. The use of treatment and care services is 2.3 times higher among exposed FSWs compared to their counterparts who were not exposed.

**Table 21 – Effects (Crude versus Net) of exposure to HIV-related SMS on use of Treatment/Care services among the FSW**

Model 1 – Bivariate					Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI		Odds Ratio (2)	P>z	95% CI		%Change
			Low	Up			Low	Up	
Exposure	Reference 2.830	0.001	1.509	5.305	Reference	0.012	1.207	4.491	-17.7
Not Exposed					2.328				
Exposed									
Age					Reference				
<25					1.283	0.307	0.795	2.071	
25-29					1.349	0.207	0.847	2.146	
30&+									
Marital status					Reference				
Not in union					0.692	0.119	0.436	1.099	
In union									
Education					Reference				
< Secondary					0.815	0.320	0.544	1.220	
Secondary & +									
Smartphone					Reference				
No					0.970	0.897	0.616	1.529	
Yes									
HIV knowledge					Reference				
Low					2.867	0.000	1.863	4.412	
Intermediate					3.631	0.000	2.204	5.983	
High									
_cons	0.707	0.000	0.586	0.852	0.380	0.000	0.245	0.588	

% Change= ((Odds ratio2/Odds ratio1) - (1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

Similar to MSM, the HIV-related knowledge is the unique significant covariate factor. The likelihood of using treatment/care increases significantly with HIV-related knowledge level.

## 3.6 PACTE-VIH HIV-related SMS and linkage to PTC

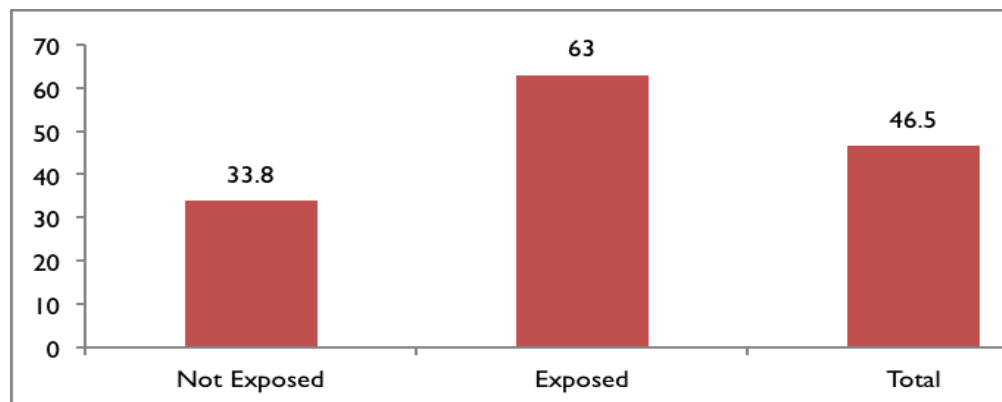
This section examines the association between exposure to the PACTE-HIV HIV-related SMS and linkage to prevention, treatment and care (PTC).

### 3.6.1 PACTE-VIH HIV-related SMS and linkage to PTC by MSM

Figure 14 shows the level of linkage to PTC by exposure to PACTE-VIH HIV-related SMS among MSM. Out of all MSM, 46.5% had high linkage to PTC. Overall, linkage to PTC is more frequent among those exposed to the PACTE-VIH HIV-

related SMS (63%), compared to their counterparts who were not exposed to SMS (34%). MSM exposed to PACTE VIH HIV-related SMS had 68% more chance of high linkage to PTC (relative risk=186%), compared to their counterparts who were not exposed.

**Figure 14 - Linkage to PTC among MSM by exposure to HIV-related SMS**



Analysis by selected socio-economic characteristics (stratification) reveals that MSM exposed to HIV-related mHealth message have higher linkage to PTC in all considered socio-economic categories (Table 22). The relative risk ranges from 110% among less educated exposed MSM to 249% among the younger exposed MSM (aged less than 25). However, this advantage is not significant, considering MSM aged 25-29, those in union, those with the lowest education level, MSM who own a smartphone and MSM with low HIV-related knowledge.

**Table 22– Exposure to SMS and linkage to PTC by MSM socio-economics characteristics**

Socio-economics Characteristics	% with high linkage to PTC							
	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	25.5	141	63.4	82	31.1461**	248.6	39.5	223
25-29	46.2	91	60.3	73	3.2381	130.5	52.4	164
30&+	34.6	52	65.6	64	11.0483**	189.6	51.7	116
<b>Marital status</b>								
Not in union	35.3	258	65.7	198	41.4109**	186.1	48.5	456
In union	19.2	26	38.1	21	2.0661	198.4	27.7	47
<b>Education</b>								
Less than secondary	40.5	37	44.4	18	0.0759	109.6	41.8	55
Secondary&+	32.8	247	64.7	201	45.2128**	197.3	47.1	448
<b>Own smartphone</b>								
No	29.3	116	43.8	48	3.1759	149.5	33.5	164
Yes	36.9	168	68.4	171	33.7755**	185.4	52.8	339
<b>Own computer</b>								
No	28.5	214	57.6	144	30.3871**	202.1	40.2	358
Yes	50.0	70	73.3	75	8.3729**	146.6	62.1	145
<b>HIV knowledge</b>								
Low	19.8	81	31.4	35	1.8656	158.6	23.3	116
High	39.4	203	69.0	184	34.0207**	175.1	53.5	387
Total	33.8	284	63.0	219	42.4084**	186.4	46.5	503
Note: % in parentheses (N<30); ** p-value <0.05								

Findings from logistic regression models (Table 23) confirm the exposure to the mHealth message advantages in linkage to PTC. MSM exposed to the PACTE-VIH HIV-related SMS were three times (OR: 2.8; CI: 1.9-4.2) more likely to have

high linkage to PTC, compared to their counterparts who were not exposed, after controlling for all selected socio-economic covariates (net effect). This effect (crude) was estimated at 3.3 times (CI: 2.3-4.8) before introducing control factors in the model (bivariate model).

**Table 23 – Effects (Crude versus Net) of exposure to SMS on linkage to PTC among MSM**

Model 1 – Bivariate					Model 2 – Multivariate				
	Odds	P>z	95% CI		Odds	P>z	95% CI		%Change
	Ratio (1)		Low	Up	Ratio (2)		Low	Up	
<b>Exposure</b>									
Not Exposed	Reference				Reference				-15.4
Exposed	3.336	0.000	2.308	4.822	2.821	0.000	1.880	4.233	
<b>Age</b>									
<25					Reference				
25-29					1.272	0.310	0.800	2.023	
30&+					1.457	0.185	0.835	2.541	
<b>Marital status</b>									
Not in union					Reference				
In union					0.292	0.002	0.132	0.646	
<b>Education</b>									
< Secondary					Reference				
Secondary & +					0.652	0.215	0.331	1.283	
<b>Smartphone</b>									
No					Reference				
Yes					1.882	0.006	1.200	2.953	
<b>Computer</b>									
No									
Yes					1.513	0.083	0.947	2.416	
<b>HIV knowledge</b>									
Low					Reference				
Intermediate					2.989	0.000	1.848	4.835	
High					4.954	0.000	2.813	8.724	
_cons	0.511	0.000	0.399	0.653	0.181	0.000	0.087	0.379	

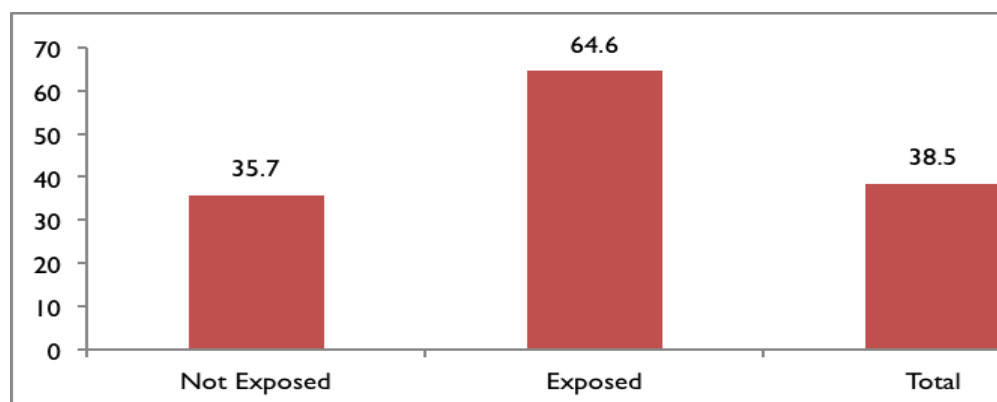
% Change= ((Odds ratio2/Odds ratio1) - (1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

With regard to control factors (covariates), MSM owning a smartphone and those with intermediate or higher HIV-related knowledge had the highest linkage to PTC. In contrast, linkage to PTC was low among the MSM living in union.

### 3.6.2 PACTE-VIH HIV-related SMS and linkage to PTC among the FSWs

This section explores the association between exposure to HIV-related SMS and linkage to PTC among FSWs in Lomé. Less than 40% of FSWs surveyed had high linkage to PTC (Figure 15). In addition, Figure 14 shows that as in the case of MSM, linkage to PTC is higher among FSWs exposed to the PACTE-VIH HIV-related SMS (65%), compared to those not exposed to the mHealth messages (36%).

**Figure 15 - Linkage to PTC among FSWs by exposure to HIV-related SMS**



The relative risk of linkage to PTC is higher among exposed to PACTE VIH HIV-related SMS FSWs (181%), compared to their counterparts who were not exposed. The relationship between exposure to HIV-related SMS and high linkage to PTC among FSWs remains significant after controlling

for covariates (Tables 24 and 25). The exposure to the mHealth differences in high linkage to PTC are significant in all socio-economic categories, except for FSWs belonging to the following categories: living in union; having lower than secondary education, owning smartphone; and having high HIV-related knowledge. Nevertheless, this absence of association should be interpreted with caution because of limited number of FSWs in these categories (Table 24). The relative risk ranges from 136% observed among FSWs owning a smartphone to 225% observed among FSWs aged 25-29.

**Table 24– Exposure to SMS and linkage to PTC by FSWs socio-economic characteristics**

Socio-economic Characteristics	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	30.1	153	60.0	10	3.8717**	199.3	31.9	163
25-29	32.6	135	73.3	15	9.6491**	224.8	36.7	150
30&+	43.4	166	60.9	23	2.4937**	140.3	45.5	189
<b>Marital status</b>								
Not in union	36.2	356	66.7	39	13.6519**	184.3	39.2	395
In union	33.7	98	55.6	9	1.7234	165.0	35.5	107
<b>Education</b>								
Less than secondary	37.0	254	55.0	20	2.5392	148.6	38.3	274
Secondary&+	34.0	200	71.4	28	14.5184**	210.0	38.6	228
<b>Own smartphone</b>								
No	34.4	343	68.6	35	15.8096**	199.4	37.6	378
Yes	39.6	111	53.9	13	0.9700	136.1	41.1	124
<b>Own computer</b>								
No	35.4	435	64.6	48	15.5773**	182.5	38.3	483
Yes	42.1	19	-	-	-	-	42.1	19
<b>HIV knowledge</b>								
Low	33.4	404	61.4	44	13.4254**	183.8	36.2	448
High	54.0	50	100.0	4	3.2052	185.2	57.4	54
<b>Total</b>	<b>35.7</b>	<b>454</b>	<b>64.6</b>	<b>48</b>	<b>15.3213**</b>	<b>181.0</b>	<b>38.5</b>	<b>502</b>

Note: % in parentheses (N<30); \*\* p-value <0.05

Findings from logistic regression (Table 25) are consistent with previous results on the association between exposure to the HIV-related SMS and HIV-related services (outreach, prevention and treatment). FSWs exposed to the HIV-related SMS are more likely to have high linkage to PTC than their counterparts who were not exposed, even after controlling for the selected socio-economic characteristics.

**Table 25 – Effects (Crude versus Net) of exposure to SMS on linkage to PTC among FSWs**

Model 1 – Bivariate					Model 2 – Multivariate				
Odds Ratio (1)	P>z	95% CI		P>z	Odds Ratio (2)	P>z	95% CI		%Change
		Low	Up				Low	Up	

<b>Exposure</b>									
Not Exposed	Reference					Reference			
Exposed	3.287	0.000	1.765	6.122		2.676	0.003	1.390	5.148
<b>Age</b>									
<25						Reference			
25-29						1.124	0.644	0.684	1.849
30&+						1.475	0.110	0.915	2.376
<b>Marital status</b>									
Not in union						Reference			
In union						0.762	0.260	0.474	1.223
<b>Education</b>									
< Secondary						Reference			
Secondary & +						0.881	0.549	0.582	1.333
<b>Smartphone</b>									
No						Reference			
Yes						1.029	0.903	0.647	1.639
<b>HIV knowledge</b>									
Low						Reference			
Intermediate						3.266	0.000	2.094	5.095
High						3.592	0.000	2.164	5.962
_cons	0.555	0.000	0.458	0.672		0.262	0.000	0.165	0.416

% Change= ((Odds ratio2/Odds ratio1) - (1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

FSWs exposed to the HIV-related SMS have 2.7 (CI: 1.4-5.1) times higher linkage to PTC than those who were not exposed, even after introducing covariates in the model (model 2), among which only HIV-related knowledge had a significant association. Consistent with findings from MSM data, linkage to PTC among the FSWs is higher among those with HIV-related intermediate and higher knowledge, compared to those with low knowledge.

#### Box VI – Summary

*This section evaluates the association between exposure to the PACTE-VIH HIV-related SMS and linkage to PTC. Analyses rely on bivariate chi-square test at bivariate and per socio-economic group, and multiple logistic regression for quantitative data.*

*Findings from quantitative analyses show high linkage to PTC of KPs (MSM and FSWs) exposed to the HIV-related SMS to HIV services compared to their counterparts who were not exposed. There are no factors through which the effect of exposure to SMS influences KPs linkage to PTC.*

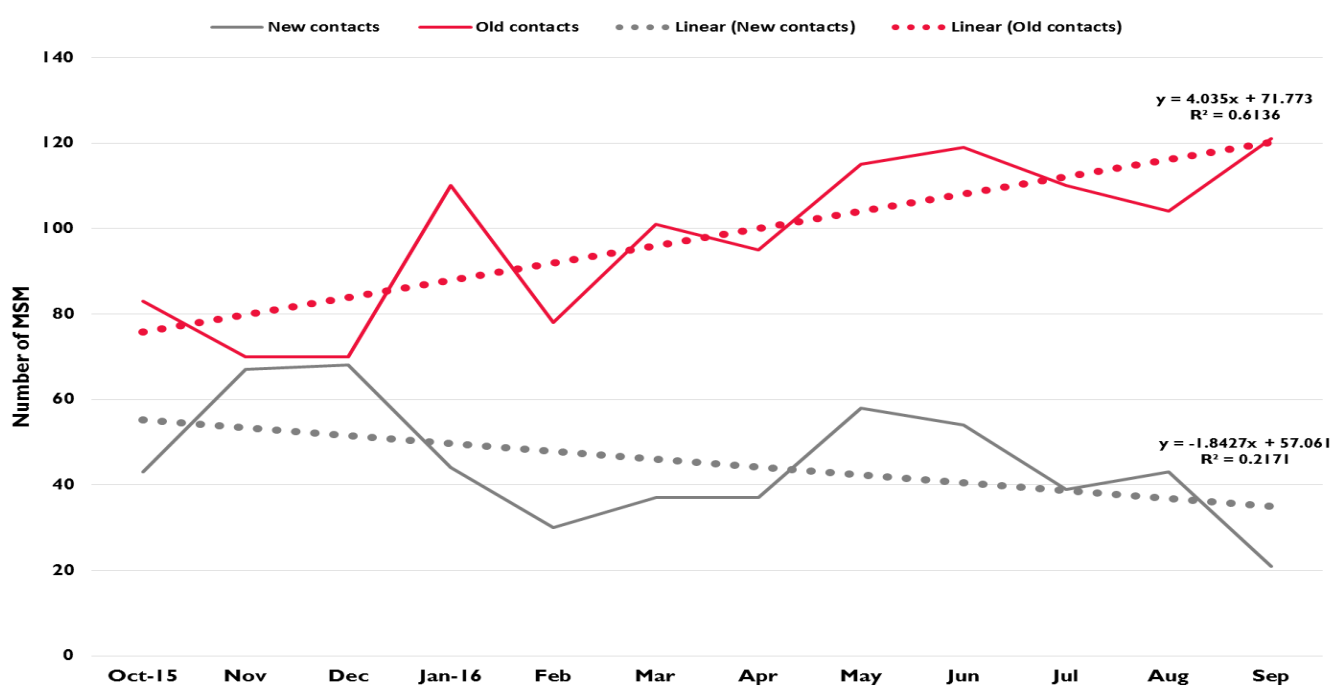
## 4. EXPOSURE TO HIV-RELATED SOCIAL MEDIA PLATFORM AND THE USE OF HIV SERVICES

The use of social media interventions has been advocated as an effective strategy to promote safe sexual behaviors, increase HIV testing, and linkage to PTC (Tso, et al., 2016; Muessig, et al., 2015; Young, et al., 2013). In 2014, PACTE-VIH introduced the HIV-related social media platform to reach the hard-to-reach MSM in Togo. The activity entailed peer educators sending private messages to their social media contacts on platforms such as Facebook, Gayromeo (now called PlanetRomeo) and WhatsApp. The Program aimed to provide HIV-prevention messages to MSM who were not reached through conventional outreach activities; refer hard-to-reach MSM to HIV and STI related services; and promote the uptake of HIV counselling and testing by hard-to-reach MSM (Zan et al., 2016). This section assesses the exposure to the PACTE VIH HIV-related social media message in Lomé and its association with the use of HIV services among the MSM.

### 4.1 Exposure to PACTE VIH HIV-related Social Media Platform

Figure 16 reports the number of MSM reached through PACTE-VIH HIV-related social media from October 2015 to September 2016 (PACTE-VIH, reports).

**Figure 16- Number of MSM reached though Social Media in Togo, October 2015-September 2016 (PACTE-VIH, reports)**



Source: PACTE-VIH reports 2015-2016

PACTE-VIH intervention targeted 270 MSM during its Y4 of implementation (October 2015-September 2016), using social media and to ensure that 50% of those reached were referred to services. Even though it is not possible to know how many MSM were reached via social media specifically in Lomé, the program reached a total of 541 MSM by the end of September 2016 for the whole of Togo. Given that most MSM in Togo are concentrated in large urban centers, it is possible that PACTE-VIH met its target for Lomé in Y4. With a total of 70 new contacts, the highest number of contacts was made in December 2015.

Data from the E4D OR survey show that 45% of MSM received their first social media message in 2015 and their last message in 2016 (54%) (Evidence for Development (E4D) West Africa, 2016b). These findings from the OR align with PACTE-VIH data, which show a decline in new social media contacts in 2016.

Figure 17 reports the number of MSM reached by the PACTE-VIH HIV-related social media platform and those who are not connected. Out of the 503 MSM surveyed, 152 (30%) reported having been reached by this platform, leaving 351 out of reach by PACTE-VIH social media activities.

Figure 17 – Exposure to the PACTE-VIH HIV-related social media

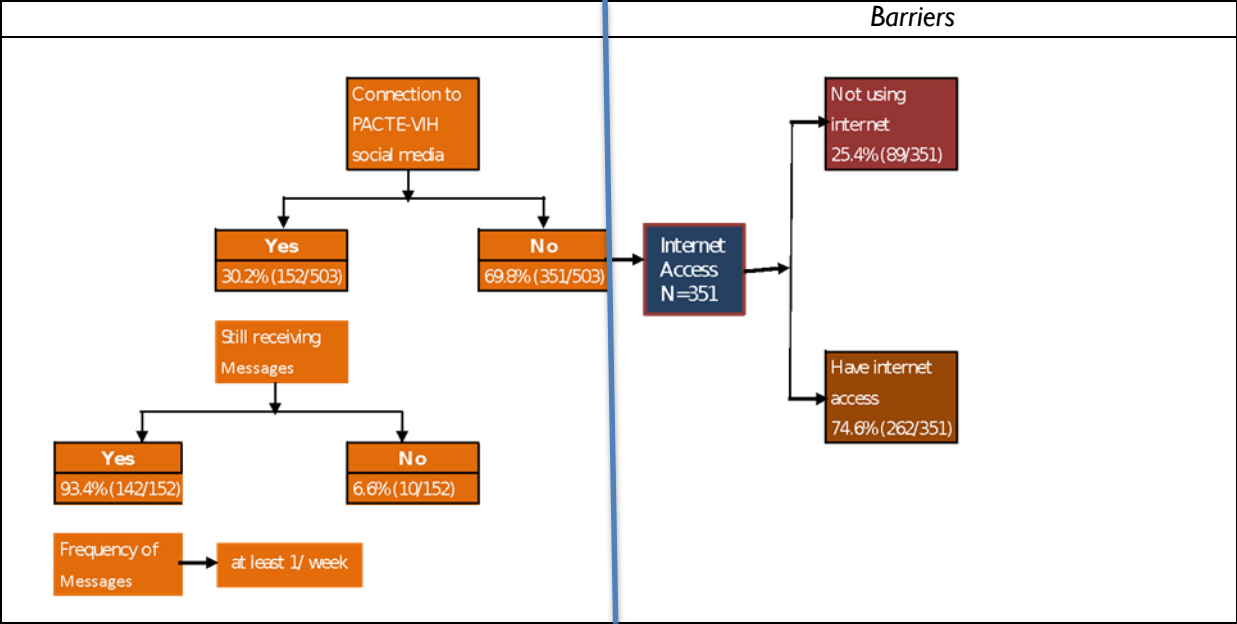


Figure 17 shows also that among the 351 MSM who were not connected to the PACTE-VIH HIV-related social media platform, 75% had internet connection. Findings from qualitative data revealed that personal choice emerged as the primary factor explaining why these MSM were not connected to the PACTE-VIH social media. It should be noted here that the MSM reached through social media were pleased with the services and found them useful, as best described by one focus group participant.

*“I am pleased when I get these kinds of messages, because there are times when you go on the internet, the day where you get the message, you have the chance to get a client. Therefore, these messages remind me to wear a condom and the use of lubricating gel. Sometimes I forget all this, but once I read the message on the day, I remember what to do. So, when I see these messages, it makes me happy” [Focus Group Discussion Participants]*

## 4.2 Socio-economic predictors of connection to the PACTE-VIH HIV-related social media

One of the objectives of this OR was to identify barriers and factors associated with the exposure to the PACTE-VIH HIV-related social media messages. Figure 17 (above) shows that Internet connectivity is not a major barrier to having access to the HIV-related social media platform for MSM since 75% of MSM who were not exposed to the PACTE VIH social media messages had internet connection.

Table 26 summarizes findings from bivariate analysis. Overall, all selected socio-economic variables are significantly associated with the exposure to the PACTE-VIH HIV-related social media platform except for age.

**Table 26 – Proportion of MSM ever exposed to HIV-related social media by socio-economic characteristics**

	Men who have sex with Men connected on HIV-related social media platform		Chi-square
	%	N	
<b>Age</b>			
<25	29.6	223	0.8669
25-29	28.7	164	
30&+	33.6	116	
<b>Marital status</b>			
Not in union	31.8	456	5.7742**
In union	14.9	47	
<b>Education</b>			
Less than secondary	18.2	55	4.2429**
Secondary&+	31.7	448	
<b>Has smartphone</b>			
No	14.6	164	28.0276**
Yes	37.8	339	
<b>Has Computer</b>			
No	24.0	358	22.6120**
Yes	45.5	145	
Total	30.2	503	
Note: % in parentheses (N<30); ** p-value <0.05			

The proportion of MSM exposed to the PACTE-VIH HIV-related social media platform is higher among unmarried, most educated (secondary education and above), and MSM owning a smartphone and/or a computer. These findings are consistent with factors associated with exposure to the PACTE-VIH HIV related SMS regarding smartphone and computer ownership. In contrast, there are not significant age differences in exposure to the PACTE-VIH HIV-related social media, whereas exposure to the PACTE-VIH HIV related SMS is increasing with MSM age. Similarly, unmarried and the most educated MSM are more likely to be exposed to the PACTE-VIH HIV-related social media, while there are no significant differences in exposure to the PACTE-VIH HIV related SMS based on marital status and level of education. Findings from multivariate logistic regression confirmed differences in marital status, the ownership of a smartphone and possession of a computer (Table 27).

**Table 27 – Predictors of exposure to PACTE-VIH HIV-related social media platform**

	Odds Ratio	P>z	Multivariate model	
			95% CI	
			Low	Up
<b>Age</b>				
<25	Reference			
25-29	0.803	0.372	0.496	1.300
30&+	1.485	0.148	0.870	2.537
<b>Marital status</b>				
Not in union	Reference			
In union	0.249	0.003	0.100	0.617
<b>Education</b>				
< Secondary	Reference			
Secondary & +	1.040	0.920	0.481	2.250
<b>Smartphone</b>				
No	Reference			
Yes	3.144	0.000	1.891	5.228
<b>Computer</b>				
No	Reference			
Yes	2.511	0.000	1.610	3.914
_cons	0.145	0.000	0.065	0.322

In contrast, the effect of education disappears after controlling for other variables. It is likely that smartphone and computer ownership captured the effect of education. Indeed, 60% of MSM with at least secondary education possess a



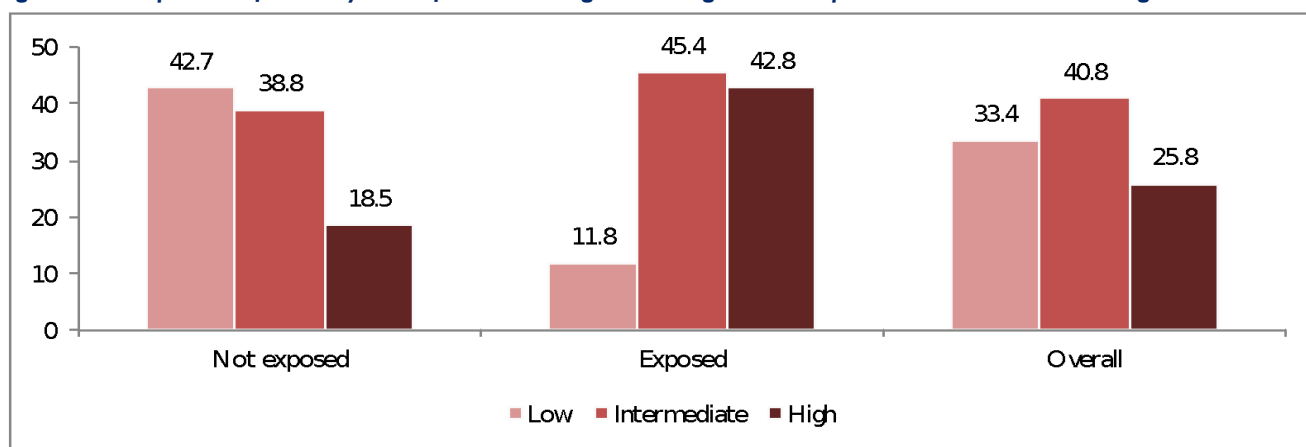
smartphone, compared to 17% of their less educated counterparts. Similarly, while 23% of the most educated MSM have a computer, only 1.7% of those with lower education owned a computer. These proportions suggest that the large majority of MSM owning a smartphone (88%) or a computer (97%) have at least secondary education.

### 4.3 Exposure to HIV-related Social Media message and HIV knowledge

Social media platforms, (Facebook, Badoo, Gayromeo/PlanetRomeo), and WhatsApp are being used to promote HIV-related knowledge, preventive behavior and access to HIV treatment and care. This section assesses the relationship between exposure to the PACTE-VIH HIV-related social media messages and HIV-related knowledge among MSM in Lomé, Togo. The dependent variable, the level of HIV-related knowledge, has three categories (low, intermediate and high), whereas the independent variable is a dummy variable (exposed versus non-exposed). Analyses rely on chi-square test (bivariate and stratification) and multivariate multinomial logistic models.

Overall, findings show that 3% of MSM had low knowledge of HIV-related issues, whereas 26% reported high knowledge of HIV-related questions. Findings from bivariate analyses show strong association between exposure to HIV-related social media and HIV-related knowledge (Figure 18 and Table 28).

**Figure 18 – Proportion of MSM by level of HIV knowledge according to their exposure to social media message**



The percentage for low HIV-related knowledge is higher among the MSM (43%) who were not exposed to the PACTE-VIH HIV-related social media messages compared to their exposed counterparts (12%). On the contrary, the proportion of MSM with high HIV-related knowledge is higher among those exposed to the social media (43%), compared to MSM not exposed to HIV-related social media messages. MSM exposed to HIV-related social media messages have 76% (RRR: 0.24; CI: 0.13-0.42) less chance of having low HIV-related knowledge, compared to their counterparts who were not exposed. In contrast, they are about 2 times (RRR: 1.97; CI: 1.26-3.09) more likely to have high HIV-related knowledge.

**Table 28 – Exposure to social media message and HIV knowledge among MSM in Lomé – Bivariate multinomial model**

	Low knowledge				High knowledge			
	RRR	P-value	95% Confidence Interval		RRR	P-value	95% Confidence Interval	
			Low B.	Up B.			Low B.	Up B.
<b>Exposure</b>								
Not Exposed	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Exposed	0.237	0.000	0.134	0.418	1.971	0.003	1.257	3.090
<b>Const</b>	1.103	0.408	0.875	1.391	0.478	0.000	0.356	0.642

Notes: \*\* P-value <0.05; RRR: Relative Risk Ratio

**Table 28– Association between exposure to social media and HIV-related knowledge by MSM socioeconomics characteristics**

Socio-economics Characteristics	Not Exposed				Exposed				Relative Risk	All				Chi-square
	Low	Interm.	High	N	Low	Interm.	High	N		Low	Interm.	High	N	
<b>Age</b>														
<25	54.1	34.4	11.5	157	16.7	47.0	36.4	66	316.5	43.1	38.1	18.8	223	32.3798**
25-29	31.6	42.7	25.6	117	12.8	42.6	44.7	47	174.6	26.2	42.7	31.1	164	8.4569**
30&+	36.4	41.6	22.1	77	2.6	46.2	51.3	39	232.1	25.0	43.1	31.9	116	18.8788**
<b>Marital status</b>														
Not in union	43.4	37.0	19.6	311	12.4	42.8	44.8	145	228.6	33.6	38.8	27.6	456	51.9181**
In union	37.5	52.5	10.0	40	(0.0)	100.0	0.0	7	0.0	31.9	59.6	8.5	47	5.5812
<b>Education</b>														
Less than secondary	46.7	46.7	6.7	45	(10.0)	(40.0)	(50.0)	10	746.3	40.0	45.5	14.6	55	13.3925**
Secondary&+	42.2	37.6	20.3	306	12.0	45.8	42.3	142	208.4	32.6	40.2	27.2	448	45.9632**
<b>Own smartphone</b>														
No	43.6	39.3	17.1	140	(8.3)	(33.3)	(58.3)	24	340.9	38.4	38.4	23.2	164	21.8135**
Yes	42.2	38.4	19.4	211	12.5	47.7	39.8	128	205.2	31.0	41.9	27.1	339	36.5242**
<b>Own computer</b>														
No	51.5	36.0	12.5	272	12.8	48.8	38.4	86	307.2	42.2	39.1	18.7	358	49.2879**
Yes	12.7	48.1	39.2	79	10.6	40.9	48.5	66	123.7	11.7	44.8	43.5	145	1.2514
Total	42.7	38.8	18.5	351	11.8	45.4	42.8	152	231.4	33.4	40.8	25.8	503	55.5819**
Note: % in parentheses (N<30); ** p-value <0.05														

Findings from stratification analysis (Table 29) also confirmed the strong relationship between exposure to HIV-related social media messages and the level of HIV-related knowledge. Indeed, the proportion of MSM with high knowledge is observed among those exposed to HIV-related social media messages regardless of the socio-economic category considered. The relative risk is higher among the MSM exposed to HIV social media messages (ranging from 124% to 340%).

Similarly, findings from the multivariate multinomial logistic model confirmed results of the bivariate model. The likelihood of having high HIV-related knowledge is higher (RRR: 1.9; CI: 1.2-3.1) among the MSM exposed to HIV-related social media messages. In contrast, this group is less likely (RRR: 0.25; CI: 0.14-0.45) to have low HIV-related knowledge, compared to their counterparts not exposed to HIV-related social media messages (Table 30).

**Table 30 – Exposure to social media message and HIV knowledge among MSM in Lomé – Multivariate multinomial model**

	Low knowledge				High knowledge			
	RRR	P-value	95% Confidence Interval		RRR	P-value	95% Confidence Interval	
			Low B.	Up B.			Low B.	Up B.
<b>Exposure</b>								
Not Exposed	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Exposed	0.247	0.000	0.136	0.449	1.943	0.006	1.207	3.128
<b>Age</b>								
<25	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
25-29	0.590	0.043	0.355	0.983	1.415	0.206	0.826	2.423
30&+	0.517	0.024	0.292	0.915	1.556	0.135	0.872	2.777
<b>Education</b>								
< Secondary	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Secondary & +	1.122	0.735	0.575	2.189	1.786	0.193	0.746	4.273
<b>Smartphone</b>								
No	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Yes	1.107	0.679	0.684	1.791	0.746	0.277	0.440	1.265
<b>Computer</b>								
No	1.000	Ref.	Ref.	Ref.	1.000	Ref.	Ref.	Ref.
Yes	0.286	0.000	0.155	0.527	1.754	0.023	1.081	2.847
cons	1.580	0.183	0.806	3.096	0.218	0.001	0.088	0.538

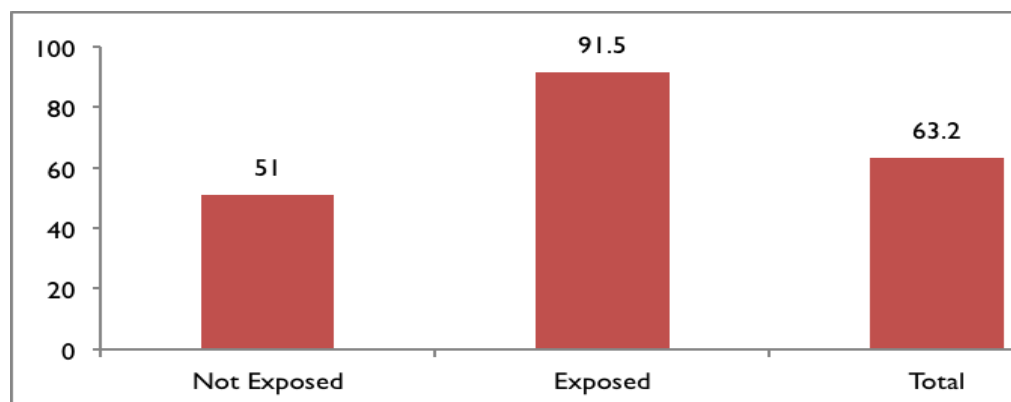
Notes: \*\* P-value <0.05; RRR: Relative Risk Ratio

Table 30 shows a similar pattern if one considers the possession of a computer. MSM owning a computer are more likely to have high HIV-related knowledge (RRR: 1.75; IC: 1.08-2.84), compared to those who do not have their own computer. The opposite trend is observed if one considers the risk of having HIV-related low knowledge. These findings are consistent with association between exposure to HIV-related SMS and HIV-related knowledge presented above.

#### 4.4 Exposure to HIV-related Social Media Message and use of DIC services

One strategy to reach the 90/90/90 UNAIDS objective is to increase the transition to use of DIC services, especially among KPs. This section analyzes association between HIV-related social media message and use of DIC services. As already stated in section 3.2.1, 63% of the 503 MSM ever visited the PACTE-VIH services. Figure 19 indicates that the proportion of MSM who ever used PACTE-VIH services through DIC is higher among MSM exposed to HIV-related social media messages (91%), compared to their counterparts (51%) who were not exposed.

**Figure 19 – Proportion of MSM who used DIC services by exposure to social media message**



Bivariate regression results indicate that the chance of visiting

a DIC is 10 times higher among the MSM exposed to the PACTE-VIH social media HIV-related messages (Table 32). This odd ratio is estimated at 9.2 (CI: 4.8-17.6) after controlling for other covariates (Table 32). Furthermore, 59% of MSM went face to face after receiving HIV-related social media messages from PACTE-VIH.

**Table 31 – Exposure to social media message and use of DIC services by MSM socio-economic characteristics**

Socio-economic Characteristics	Ever visited PACTE-VIH DIC				Chi-square	Relative Risk	Overall	
	Not Exposed %	N	Exposed %	N			%	N
<b>Age</b>								
<25	35.7	157	89.4	66	53.7010**	250.4	51.6	223
25-29	59.0	117	93.6	47	18.7803**	158.6	68.9	164
30&+	70.1	77	92.3	39	7.3221**	131.7	77.6	116
<b>Marital status</b>								
Not in union	52.1	311	91.7	145	68.0117**	176.0	64.7	456
In union	42.5	40	(85.7)	7	4.4522**	201.6	48.9	47
<b>Education</b>								
Less than secondary	64.4	45	(90.0)	10	2.5021	139.8	69.1	55
Secondary&+	49.0	306	91.6	142	74.8523**	186.9	62.5	448
<b>Own smartphone</b>								
No	50.7	140	(91.7)	24	13.9959**	180.9	56.7	164
Yes	51.2	211	91.4	128	57.7457**	178.5	66.4	339
<b>Own computer</b>								
No	48.2	272	90.7	86	48.6552**	188.2	58.4	358
Yes	60.8	79	92.4	66	19.3180**	152.0	75.2	145
<b>HIV knowledge</b>								
Low	42.0	150	(72.2)	18	5.9255 **	171.9	45.2	168
Intermediate	56.6	136	92.8	69	27.8370**	164.0	68.8	205
High	60.0	65	95.4	65	23.4790**	159.0	77.7	130
<b>Total</b>	<b>51.0</b>	<b>351</b>	<b>91.5</b>	<b>152</b>	<b>74.6383 **</b>	<b>179.4</b>	<b>63.2</b>	<b>503</b>

Note: % in parentheses (N<30); \*\* p-value <0.05

This persistent and consistent effect of exposure to HIV-related social media message on the transition to DIC visit, after controlling for the selected socio-economic covariates, suggests the absence of mediating factors. Findings from stratification (Table 31) confirm this association because MSM exposed to HIV-related social media message were more likely to visit DIC regardless of the socio-economic category considered. The relative risk indicator ranges from 132% (MSM aged at least 30) to 250% (MSM aged less than 25).

**Table 32 – Effects (Crude versus Net) of exposure to social media message on use of DIC services among MSM**

	Model 1 – Bivariate		Model 2 – Multivariate	
	Odds	95% CI	Odds	95% CI

	Ratio (1)	P>z	Low	Up	Ratio (2)	P>z	Low	Up	%Change
<b>Exposure</b>									
Not Exposed	Reference				Reference				
Exposed	10.274	0.000	5.606	18.829	9.233	0.000	4.845	17.594	-10.1
<b>Age</b>									
<25					Reference				
25-29					2.082	0.003	1.288	3.365	
30&+					3.197	0.000	1.823	5.606	
<b>Education</b>									
< Secondary					Reference				
Secondary & +					0.571	0.111	0.286	1.138	
<b>Smartphone</b>									
No					Reference				
Yes					1.057	0.810	0.672	1.663	
<b>Has a computer</b>									
No					Reference				
Yes					1.221	0.456	0.722	2.064	
<b>HIV knowledge</b>									
Low	Reference				Reference				
Intermediate					1.684	0.032	1.047	2.708	
High					1.926	0.034	1.052	3.524	
_cons	1.041	0.709	0.844	1.283	0.693	0.313	0.340	1.412	

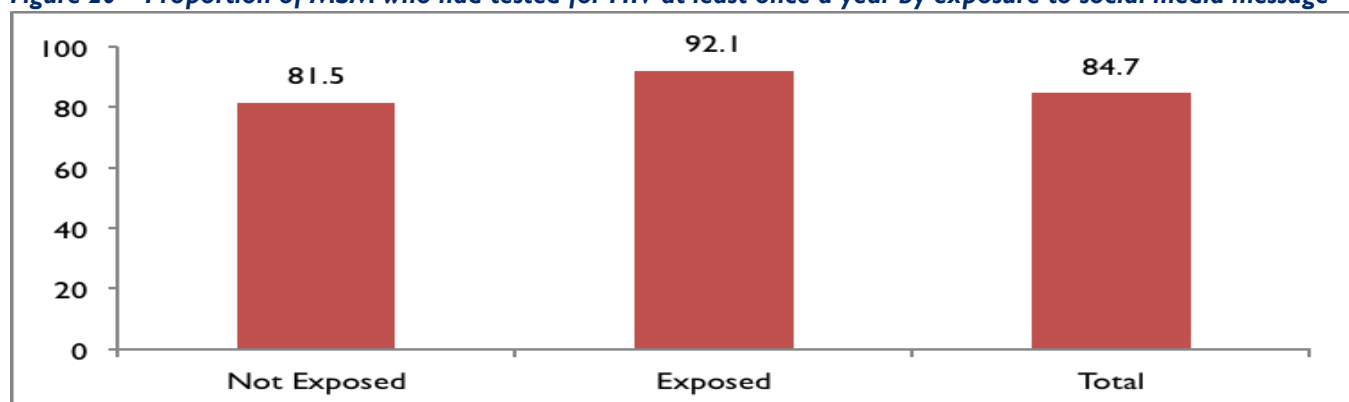
% Change= ((Odds ratio2/Odds ratio1) -(1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

Table 32 reveals that MSM age and their level of knowledge are other variables significantly associated with the use of DIC services. Use of DIC services increases significantly with age and the level of knowledge. These findings are consistent with those observed in section 3 (factors associated with outreach).

## 4.5 Exposure to HIV-related Social Media Message and Regular HIV Testing

As in section 3.4, the current section measures the association between exposure to HIV-related social media messages and regular HIV testing among the MSM in Lomé and also identifies potential mediating factors. Number of HIV tests performed per year (at least one) is the indicator of preventive behavior. Analyses rely on chi-square test (at bivariate and strata level) and logistic regression models (bivariate and multivariate). Figure 20 and Table 34 show significant association between the two variables (exposure to HIV-related social media messages and regular HIV testing).

**Figure 20 – Proportion of MSM who had tested for HIV at least once a year by exposure to social media message**



Whereas 92% of MSM exposed to HIV-related social media messages underwent at least one HIV test per year, the corresponding proportion is estimated at 82% for their counterparts not exposed to social media. The relative risk is above 100% in all socio-economic categories, except if one considers MSM who do not own a smartphone (Table 33).

**Table 33 – Exposure to social media message and prevention behavior by MSM socio-economics characteristics**

Socio-economics Characteristics	Ever visited PACTE-VIH DIC							
	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	81.5	157	93.9	66	5.6764**	115.2	85.2	223
25-29	83.8	117	91.5	47	1.6611	109.2	86.0	164
30&+	77.9	77	89.7	39	2.4401	115.1	81.9	116
<b>Marital status</b>								
Not in union	81.4	311	92.4	145	9.4255 **	113.5	84.9	456
In union	82.5	40	(85.7)	7	0.0436	103.9	83.0	47
<b>Education</b>								
Less than secondary	68.9	45	(80.0)	10	0.4897	116.1	70.9	55
Secondary&+	83.3	306	93.0	142	7.6383**	111.6	86.4	448
<b>Own smartphone</b>								
No	76.4	140	(75.0)	24	0.0231	98.2	76.2	164
Yes	84.8	211	95.3	128	8.7888**	112.4	88.8	339
<b>Own computer</b>								
No	79.0	272	91.9	86	7.3106 **	116.3	82.1	358
Yes	89.9	79	92.4	66	0.2867	102.8	91.0	145
<b>HIV knowledge</b>								
Low	87.3	150	(100.0)	18	2.5707	114.5	88.7	168
Intermediate	72.1	136	85.5	69	4.6168**	118.6	76.6	205
High	87.7	65	96.9	65	3.9000**	110.5	92.3	130
Total	81.5	351	92.1	152	9.2337**	113.0	84.7	503
Note: % in parentheses (N<30); ** p-value <0.05								

Indeed, the proportion of MSM performing HIV-test regularly is higher among those exposed to HIV-related social media messages, regardless of the socio-economic category considered. These findings suggest the absence of mediating factors explaining the relationship between exposure to HIV-related social media messages and preventive behavior (regular HIV testing).

Findings from logistic regression models (Table 34) are consistent with those from stratification. The likelihood of undergoing HIV test at least once a year (Table 34) is more than twice among MSM exposed to HIV-related social media messages, compared to MSM who were not exposed, even after controlling for socio-economic covariates (OR: 2.29; CI: 1.14-4.62).

**Table 34 – Effects (Crude versus Net) of exposure to social media messages on HIV regular testing among MSM**

Model 1 – Bivariate					Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI		Odds Ratio (2)	P>z	95% CI		%Change
			Low	Up			Low	Up	
<b>Exposure</b>									
Not Exposed	Reference				Reference				
Exposed	2.652	0.003	1.387	5.070	2.290	0.021	1.135	4.623	-13.6
<b>Age</b>									
<25					Reference				
25-29					1.074	0.822	0.577	2.000	
30&+					0.800	0.497	0.419	1.524	
<b>Education</b>									
< Secondary					Reference				
Secondary & +					1.620	0.187	0.792	3.316	
<b>Smartphone</b>									
No					Reference				
Yes					1.918	0.019	1.111	3.312	
<b>Computer</b>									
No									

Yes					1.773	0.108	0.883	3.560	
<b>HIV knowledge</b>									
Low					Reference				
Intermediate					0.292	0.000	0.158	0.543	
High					0.863	0.740	0.362	2.060	
_cons	4.400	0.000	3.361	5.760	3.470	0.002	1.565	7.697	

% Change= ((Odds ratio2/Odds ratio1) -(1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

Table 34 reveals also that smartphone ownership and HIV-related knowledge are statistically associated with HIV regular testing. Findings show also that the likelihood of undergoing HIV test regularly is higher among the MSM with low knowledge, compared to those with intermediate HIV-related knowledge. In addition, there is no significant difference between MSM with higher HIV-related knowledge, compared to those with low HIV-related knowledge.

*In summary, 85% of MSM surveyed reported being linked to prevention, falling short of the 90% UNAIDS goal. However, 92% of MSM exposed to the HIV-related social media message were linked to prevention, above UNAIDS 90-90-90 goal.*

## 4.6 HIV-related Social Media Message and use of Treatment and Care services

This section analyzes the association between the PACTE-VIH social media message and the use of treatment and care services among the MSM in Lomé, Togo. The method relies on chi-square test at bivariate level and by socio-economic strata, and logistic regression models (bivariate and multivariate).

Figure 21 reveals that 84% of MSM exposed to the PACTE-VIH HIV-related social media message ever used treatment/care services. However, only 37% unexposed to the HIV-related social media messages ever used the treatment and care services.

**Figure 21 – Access to treatment among MSM by exposure to HIV-related SMS**

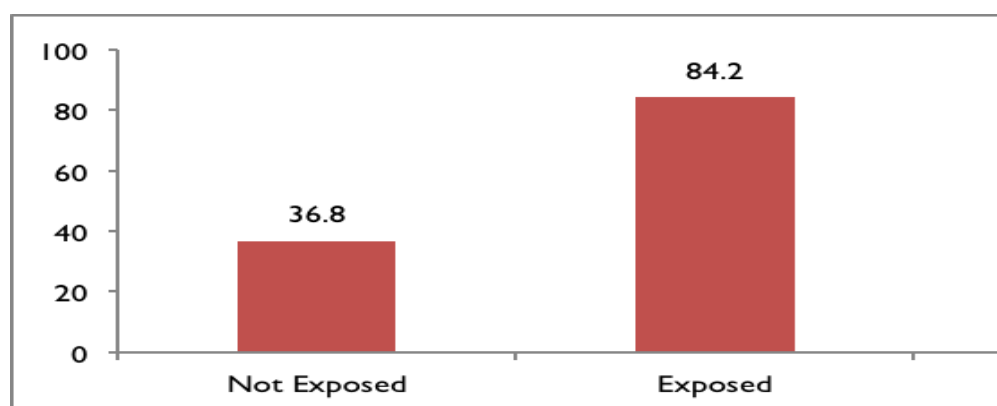


Table 35 reports consistent and significant association between exposure to HIV-related social media messages and the use of treatment and care services among the MSM in Lomé. The relative risk ranges from 157% to 313%. In other words, regardless of socio-economic category, the use of treatment/care services is higher among the MSM exposed to HIV social media messages (Table 35).

**Table 35 – Exposure to social media messages and use of treatment/care services by MSM socio-economics characteristics**

		Treatment/Care PACTE-VIH DIC	
Socio-economics	Not Exposed	Exposed	Relative
			Overall

Characteristics	%	N	%	N	Chi-square	Risk	%	N
<b>Age</b>								
<25	26.1	157	81.8	66	58.9631**	313.4	42.6	223
25-29	44.4	117	85.1	47	22.5104**	191.7	56.1	164
30&+	46.8	77	87.2	39	17.6801**	186.3	60.3	116
<b>Marital status</b>								
Not in union	37.9	311	84.1	145	84.6513**	221.9	52.6	456
In union	27.5	40	(85.7)	7	2.5550	311.6	36.2	47
<b>Education</b>								
Less than secondary	44.4	45	(90.0)	10	6.8122**	202.7	52.7	55
Secondary&+	35.6	306	83.8	142	90.0945**	235.4	50.9	448
<b>Own smartphone</b>								
No	36.4	140	75.0	24	12.5067**	206.0	42.1	164
Yes	37.0	211	85.9	128	77.3445**	232.2	55.5	339
<b>Own computer</b>								
No	32.4	272	86.1	86	76.0368**	265.7	45.3	358
Yes	51.9	79	81.8	66	14.2480**	157.6	65.5	145
<b>HIV knowledge</b>								
Low	21.3	150	55.6	18	10.0385**	261.0	25.0	168
Intermediate	47.1	136	84.1	69	26.0068**	178.6	59.5	205
High	50.8	65	92.3	65	27.5414**	181.7	71.5	130
Total	36.8	351	84.2	152	95.6041**	228.8	51.1	503
Note: % in parentheses (N<30); ** p-value <0.05								

Similarly, Table 36 indicates that the likelihood of linkage to treatment or care is 7 times higher (OR: 6.89; CI: 4.08-11.67) among the MSM exposed to the HIV-related social media messages, compared to their counterparts who were not exposed after controlling for the effect of covariates. That indicator is estimated at 9.18 (CI: 5.64-14.94) without controlling for socio-economic factors (covariates). These findings confirm the positive role of the PACTE-VIH HIV-related social media in linking KP to treatment/care. There is no mediating factor because the association between exposure to HIV-related social media messages and linkage to treatment/care remains significant after controlling all covariates (Table 36), and in all the socio-economic categories (Table 35).

**Table 36 – Effects (Crude versus Net) of exposure to SMS on Treatment/Care among MSM**

Model 1 – Bivariate					Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI		Odds Ratio (2)	P>z	95% CI		%Change
			Low	Up			Low	Up	
Exposure	Reference				Reference				-24.8
Not Exposed									
Exposed	9.178	0.000	5.640	14.937	6.899	0.000	4.078	11.670	
Age					Reference				
<25									
25-29					1.564	0.069	0.965	2.535	
30&+					1.758	0.041	1.025	3.015	
Marital status									
Not in union					Reference				
In union					0.587	0.122	0.298	1.153	
Education									
< Secondary					Reference				
Secondary & +					1.200	0.436	0.758	1.901	
Smartphone									
No					Reference				
Yes					1.140	0.602	0.696	1.868	
HIV knowledge									
Low					Reference				
Intermediate					3.092	0.000	1.896	5.042	
High					4.110	0.000	2.274	7.431	
_cons	0.581	0.000	0.468	0.722	0.282	0.001	0.137	0.581	

% Change= ((Odds ratio2/Odds ratio1) - (1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.



Considering the effect of control variables, Age and HIV-related knowledge are the only significant covariates. Linkage to treatment/care increases with age and with the level of knowledge.

## 4.7 HIV-related Social Media Message and linkage to PTC

This section analyzes how the use of social media strategies improve MSM linkage to PTC. In this study, MSM who adhered to PTC were those linked to prevention, as well as treatment and care. Out of all the MSM, 46.5% have high linkage to PTC (Figure 22). Overall, those exposed to social media messages had higher linkage to PTC e (79%), compared to their counterparts (32%) who were not exposed. This finding is consistent with high linkage to PTC observed among both MSM and FSW exposed to HIV-related SMS.

**Figure 22 - Transition to linkage to PTC among MSM by exposure to HIV-related social media messages**



Findings from stratification (Table 37) show that the relationship between exposure to HIV-related social media messages and linkage to PTC remains significant in all the socio-economic categories. MSM exposed to HIV-related social media message have the higher prevalence of linkage to PTC to PTC, regardless of the socio-economic category considered. The relative risk is greater than 130% in all socio-economic categories.

**Table 37 – Exposure to social media message and linkage to PTC by MSM socio-economic characteristics**

					Linkage to PTC			
Socio-economic Characteristics	Not Exposed		Exposed		Chi-square	Relative Risk	Overall	
	%	N	%	N			%	N
<b>Age</b>								
<25	23.6	157	77.3	66	56.1016**	327.5	39.5	223
25-29	41.0	117	80.9	47	21.3233**	197.3	52.4	164
30&+	37.7	77	79.5	39	18.1360**	210.9	51.7	116
<b>Marital status</b>								
Not in union	34.1	311	79.3	145	80.9886**	232.6	48.5	456
In union	20.0	40	71.4	7	7.8749**	357.0	27.7	47
<b>Education</b>								
Less than secondary	35.6	45	70.0	10	3.9897**	196.6	41.8	55
Secondary&+	32.0	306	79.6	142	88.0202**	248.8	47.1	448
<b>Own smartphone</b>								
No	29.3	140	58.3	24	7.7556**	199.0	33.5	164
Yes	34.6	211	82.8	128	74.3173**	239.3	52.8	339
<b>Own computer</b>								
No	28.3	272	77.9	86	66.8506**	275.3	40.2	36.3
Yes	64.3	70	85.3	75	17.1073**	132.7	62.1	145
<b>HIV knowledge</b>								
Low	20.7	150	55.6	18	10.6038**	268.6	24.4	168

Intermediate	38.2	136	75.4	69	25.2445 **	197.4	50.7	205
High	47.7	65	89.2	65	25.9715**	187.0	68.5	130
Total	32.5	351	79.0	152	92.0603**	243.1	46.5	503
Note: % in parentheses (N<30); ** p-value <0.05								

In a similar way, the effect of exposure to HIV-related social media messages on linkage to PTC remains significant after controlling for all covariates (Table 38). Indeed, after controlling for all selected socio-economic factors, MSM exposed to social media were five times more likely to have high linkage to PTC, compared to their counterparts who were not exposed. These findings suggest the absence of mediating factors because the effect of exposure to HIV-related social media messages remains significant after controlling for other factors.

**Table 38 – Effects (Crude versus Net) of exposure to social media message on linkage to PTC among MSM**

	Model 1 – Bivariate				Model 2 – Multivariate				
	Odds Ratio (1)	P>z	95% CI		Odds Ratio (2)	P>z	95% CI		%Change
			Low	Up			Low	Up	
<b>Exposure</b>									
Not Exposed	Reference				Reference				
Exposed	7.796	0.000	4.974	12.219	5.444	0.000	3.362	8.816	-30.2
<b>Age</b>									
<25					Reference				
25-29					1.549	0.072	0.961	2.497	
30&+					1.355	0.262	0.797	2.303	
<b>Education</b>									
< Secondary					Reference				
Secondary & +					0.721	0.345	0.366	1.421	
<b>Smartphone</b>									
No					Reference				
Yes					1.627	0.038	1.028	2.575	
<b>Computer</b>									
No									
Yes					1.221	0.414	0.756	1.971	
<b>HIV knowledge</b>									
Low					Reference				
Intermediate					2.130	0.003	1.303	3.480	
High					3.621	0.000	2.019	6.493	
_cons	0.481	0.000	0.385	0.601	0.202	0.000	0.096	0.423	

% Change= ((Odds ratio2/Odds ratio1) -(1)) \*100; Crude effect= odd ratio from bivariate model; Net effect= odd ratio from multivariate model.

Given the effect of control factors, Table 38 shows also that possession of a smartphone and the HIV-related knowledge are the significant covariates. The likelihood of high linkage to PTC is higher among the MSM who own smartphone (OR: 1.62; CI: 1.03-2.57). Similarly, the likelihood of high linkage to PTC increases with the level of HIV-related knowledge.

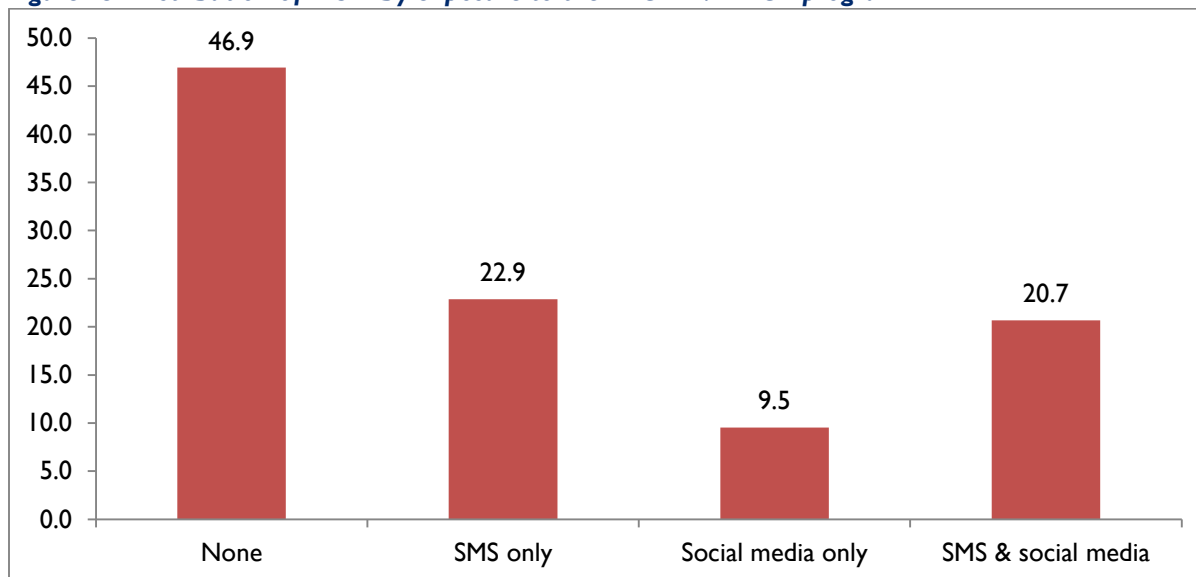
#### Box VII – Summary

The objective of this section is to assess the effect of exposure to HIV-related social media on use of DIC services, regular HIV testing, treatment/care and linkage to PTCTC. Findings from quantitative analyses are consistent. Exposure to HIV-related social media messages is positively linked to PTC. MSM exposed to HIV-related social media messages are more likely to have high HIV-related knowledge, to visit the DIC, to perform HIV test regularly (at least once a year), to have linkage to treatment/care and to have high linkage to PTC. Findings suggest the absence of mediating factors because the advantage of MSM exposed to HIV-related social media messages remains significant in all socio-economic categories.

## 5. EXPOSURE TO SMS OR SOCIAL MEDIA MESSAGES AND LINKAGE TO PTC: WHAT MATTERS?

Findings from different analyses reveal that promoting ICT interventions, including mobile health (mHealth) approaches, short-message service (SMS) and social media text messaging improves various HIV prevention, care and treatment efforts (knowledge, outreach, preventive behavior, linkage to treatment/care). The study separately considered exposure to SMS and exposure to HIV-related social media. However, some of the participants could be exposed to both SMS and social media messages. This section evaluates exposure to ICT approaches (SMS and social media) on knowledge, use of DIC services, preventive behavior, linkage to treatment and care and linkage to PTC. The independent variable encompasses four categories: (1) not exposed to both programs; (2) exposed to SMS; (3) exposed to social media; (4) exposed to SMS and social media. The analyses focused on only MSM because the PACTE-VIH HIV-related social media messages do not cover FSWs. Figure 23 reports the distribution of MSM by exposure to the PACTE-VIH HIV-related ICT program. The majority of MSM (53.1%) are enrolled in the PACTE-VIH HIV-related ICT programs.

**Figure 23- Distribution of MSM by exposure to the PACTE-VIH ICT program**



The proportion of MSM exposed to both SMS and social media programs is estimated at 21%, whereas 23% are exposed to SMS only and 10% to social media only. About 47% of MSM are not exposed to SMS or social media.

Table 39 shows that exposure to any PACTE-VIH ICT program is associated with high knowledge and linkage to preventive, treatment and care behavior.

**Table 39 – Exposure to PACTE-VIH ICT program and use of DIC services and PTC among the MSM in Lomé**

	N	High knowledge		Use of DIC services		Preventive beh.		Treatment/Care		Linkage to PTC	
		%	Chi-sq.	%	Chi-sq.	%	Chi-sq.	%	Chi-sq.	%	Chi-sq.
Exposure to ICT prog.											
None	236	17.8		43.2		75.9		32.2		27.5	
SMS only	115	20.0		67.0		93.0		46.1		42.6	
Social media only	48	33.3	59.13**	81.3	96.51**	91.7	26.88**	70.8	106.59**	64.6	104.93**
SMS & social media	104	47.1		96.2		92.3		90.4		85.6	
Exposed to any program											
No	236	17.8	24.32**	43.2	76.48**	75.9	26.82**	32.2	63.49**	27.5	64.37**

Yes	267	33.0	80.9	92.5	67.8	63.3
<b>Total</b>	<b>503</b>	<b>25.8</b>	<b>63.2</b>	<b>84.7</b>	<b>51.1</b>	<b>46.5</b>

Proportions of MSM with high HIV-related knowledge and who are linked to HIV-related services (prevention and treatment/care) are higher among those who are exposed to both SMS and social media program, followed by those who are exposed to any other program (SMS or social media). Findings from multiple logistic regression models (Table 40) confirm the effect of exposure to the PACTE-VIH HIV-related ICT programs on PTC.

**Table 40 – Effect of exposure to PACTE-VIH ICT on use of DIC services and PTC among MSM in Lomé**

	High knowledge		Use of DIC services		Preventive behavior		Treatment/Care		Linkage to PTC	
	OR	P-value	OR	P-value	OR	P-value	OR	P-value	OR	P-value
<b>Exposure to ICT prog.</b>										
None	Ref		Ref		Ref		Ref		Ref	
SMS only	1.12	0.718	2.67	0.000	4.23	0.000	1.74	0.023	1.86	0.012
Social media only	2.15	0.039	6.19	0.000	3.02	0.046	5.05	0.000	4.35	0.000
SMS & social media	3.22	0.000	31.82	0.000	2.93	0.011	17.71	0.000	12.55	0.000
<b>Exposed to any program</b>										
No	Ref		Ref		Ref		Ref		Ref	
Yes	1.94	0.004	5.41	0.000	3.49	0.000	4.00	0.000	3.93	0.000

Except for the preventive behavior, MSM exposed to both SMS and social media services are more likely to have high HIV-related knowledge, and have a link to the HIV services, compared to their counterparts.

#### **Box VIII – Summary**

*The objective of this section is to assess the effect of exposure to the PACTE VIH HIV-related ICT programs and the use of DIC services, regular HIV testing, treatment/care and linkage to PTC. Exposure to any PACTE VIH HIV-related program is positively linked to PTC. The effect is higher for MSM exposed to both HIV-related social media and SMS. Findings suggest the absence of mediating factors because the connection remains significant after controlling for all covariates. Nevertheless 47% of MSM are still not exposed to any PACTE-VIH HIV-related ICT. Lack of mobile phone and fear of sexual orientation disclosure seem to be the principal barriers.*

## CONCLUDING REMARKS

This operations research examined the influence of the PACTE-VIH ICT programs, including the HIV-related SMS for KP and the HIV-related social media messages (Facebook, Badoo, Gayromeo/PlanetRomeo), and WhatsApp for MSM on the use of face-to-face (FTF) PTC services by KP in Lomé, Togo. Table 41 summarizes the key findings, which could be applied to the design and implementation of future ICT programs targeting KP.

**Table 41 –Summary of findings**

	<b>MSM</b>	<b>FSWs</b>	<b>Comments</b>
Exposure to SMS	43.5% of MSM are exposed to the PACTE-VIH HIV-related SMS.	Only 10% of FSWs are exposed to the PACTE-VIH HIV-related SMS.	Large proportions of KPs, especially FSWs are still not exposed to the PACTE-VIH HIV-related SMS. Mobility and fear of disclosure of sexual orientation are the major barriers. Findings from qualitative survey support evidence from quantitative analyses.
Effect of SMS on Knowledge	Exposure to SMS is associated with high HIV-related knowledge though the differences are not significant after controlling for socio-economic factors.	Exposure to SMS is associated with high HIV-related knowledge though the differences are not significant after controlling for socio-economic factors.	The effect of exposure to the PACTE-VIH HIV-related SMS on the level of HIV-related knowledge is probably mediated by KP socio-economic characteristics, including age, marital status, education, possession of smartphone and/or computer.
Effect of SMS on the use of DIC services	MSM exposed to SMS are more likely to visit DIC.	FSW exposed to SMS are more likely to visit DIC.	There are no mediating factors for MSM and FSWs.
Effect of SMS on preventive behavior	MSM exposed to SMS are more likely to go for HIV test at least once a year.	FSW exposed to SMS are more likely to go for HIV test at least once a year.	There are mediating factors. Findings are consistent for MSM and FSW. More than 90% of KPs exposed to ICT are regularly tested for HIV.
Effect of SMS on treatment	MSM exposed to SMS are more likely to use treatment and care services than their counterparts who were not exposed.	FSW exposed to SMS are more likely to use treatment and care services than their counterparts who were not exposed.	Exposure to SMS is associated with higher use of treatment and care services regardless of socio-economic characteristics.
Effect of SMS on linkage to PTC	MSM exposed to SMS are more likely to have high linkage to the PTC than their counterparts who were not exposed.	FSW exposed to SMS are more likely to have high linkage to the PTC than their counterparts who were not exposed.	MSM and FSWs exposed to the HIV-related SMS are more likely linked to PTC than their counterparts who were not exposed. There are no factors through which the effect of exposure to SMS influences KPs linkage to PTC.
Effect of social media on PTC	MSM exposed to HIV-related social media messages are more likely to have high HIV-related knowledge, to visit the DIC, to perform HIV test regularly (at least once a year), to		Exposure to both HIV-related social media and SMS increases significantly the use of HIV-related services and HIV-related knowledge. However, 47% of MSM are not connected to the ICT programs.

	MSM	FSWs	Comments
	have linkage to treatment/care and to have high linkage to PTC.		

The E4D OR study population was relatively comparable to those reached by the PACTE-VIH program, which also enabled E4D to interpret OR results using some insights from PACTE-VIH programmatic data.

RQ 1 aimed to assess how social media and SMS improved HIV outreach, knowledge, and the link to PTC. E4D found that the use of mHealth and social media strategies is associated with improved use of DIC services, link to prevention, and link to treatment and care. Though an accurately representative PTC cascade cannot be estimated based on the OR study design, it is important to note that more than 90% of KP (MSM and FSWs) exposed to PACTE-VIH SMS and social media were regularly undertaking HIV test. This link remains significant in all socio-economic categories and after controlling for all socio-economics covariates. These findings suggest the absence of mediating factors.

RQ2 aimed to assess the effects of mHealth and social media strategies on linkage to PTC of KP to PTC. E4D found that linkage to PTC is higher among KPs exposed to SMS and social messages through PACTE-VIH. Even when controlling for socio-economic factors, those exposed to mHealth and social media strategies have a higher probability of linkage to PTC.

RQ3 aimed to understand facilitators of and barriers to ICT approaches with KPs. Even with the important advantages of mHealth and social media strategies, the primary factor that facilitated participation in the PACTE-VIH program was the involvement of peer educators. Given their status as trusted members of KP, peer educators were successful in conducting outreach activities and finding hard-to-reach KP to refer to services. At the individual level, more mature KP (aged at least 25), the most educated, and those owning a smartphone and/or a computer had more advantages, compared to their counterparts.

A few important barriers included: not wanting to receive messages for confidential reasons; not using the internet at all; losing a phone or changing their SIM card; and, specifically among FSW, the inability to read or understand the language of the messages (developed in French). From the socio-economic point of view, KPs living in union were less likely to have high knowledge, to be connected on mHealth/social media, as well as to use PTC. However, a small number of KPs in this category does not allow for making a strong statement.

In conclusion, given the above findings, PACTE-VIH HIV-related SMS and social media messages are effective in improving use of DIC services, linkage to prevention, and linkage to treatment and care.

However, these results may eventually raise the discussions about efficacy and effectiveness of the program. Indeed, the PACTE-VIH HIV-related SMS program reached only 10% of FSWs, compared to 90% not exposed. About 53% of surveyed MSM were exposed to PACTE-VIH HIV-related SMS and/or social media messages among whom 20% fall under both programs. Fear of sexual orientation disclosure and/or occupation status is one of the major reasons. This finding is consistent with environmental barriers (internal and external) raised in the PACTE-VIH evaluation report in 2015.

## PROGRAMMATIC IMPLICATIONS

Results from the operations research show that exposure to ICT strategies targeting KP (SMS for MSM and FSW, social media for MSM) can make a significant difference in the odds of being reached and linked to PTC. However, the success of such programs relies on the uptake of mHealth and internet technology by the target population. It is clear from the results that in the case of Lomé, FSW (10%) are less likely to be reached by the PACTE-VIH ICT program than the MSM (53% for SMS and/or Social Media). Even among MSM, the target for the social media component of PACTE-VIH, a substantial portion of this group with access to the internet intentionally chooses to not engage in social media.

At the same time, SMS interventions need to take into consideration that in some contexts, especially within vulnerable populations such as FSW, most of the cell phones users regularly change their phone numbers (or have multiple numbers) due to frequent changing of SIM cards.

On a positive note, a strategy that worked for both MSM and FSW in Lomé was the integration of peer educators into the program. Exposure to peer educators has shown significant increases in consistent condom use, improved HIV knowledge and increased use of lubricants in many programs in Africa (Geibel, 2012). Although not considered an mHealth strategy per se, a combined effect of peer educator exposure with mHealth and ICT strategies might be important in any program where KP reside in contexts similar to those seen in Lomé.

Similar to the PACTE-VIH intervention, future programs should also consider the type of ICT strategy according to the KP sub-group they are trying to reach. For example, SMS seem to be more suitable for FSW while MSM could benefit from both social media and SMS. Opportunities do exist to reach FSW via social media. However, in the contexts similar to Lomé, incentives to use social media would have to be incorporated into the program.

The importance of mHealth and social media strategies is known, but full understanding of how to introduce and implement such strategies with KP to get best results needs further research. A systematic review of the literature on mHealth for HIV prevention and treatment concluded that there is mounting evidence to support mHealth tools to improve linkage to care, retention in care, and adherence to ART (Catalani, Philbrick, Fraser, Mechael, & Israelski, 2013). The same review emphasizes that future mHealth efforts must explicitly focus on the most HIV-vulnerable populations such as sex workers and MSM. The results of this operations research provide more evidence on the effects of using mHealth to improve HIV prevention, care and treatment for MSM and FSW sub-groups in Togo.

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## APPENDIX

### Appendix I - SMS Messages sent by PACTE-VIH to KP

1. Parce que ma vie est précieuse, je prends mes médicaments chaque jour aux heures indiquées et je suis en forme. / Because my life is precious, I take my medications every day at the right time so that I'm healthy.
2. Ma vie est précieuse. Je prends mes médicaments chaque jour pour garder la forme. /My life is precious. I take my medications every day to stay healthy.
3. Homme ou femme, peu importe. L'ennemi, c'est le SIDA. No condom, no sex. /Man or woman, it doesn't matter. The enemy is AIDS. No condom, no sex.
4. Peu importe, avec un homme ou une femme. L'ennemi, c'est le SIDA. N'oublie jamais d'enfiler ton condom. / It doesn't matter if it's with a man or a woman. The enemy is AIDS. Never forget to put on a condom.
5. Homo ou hétéro, peu importe. L'ennemi c'est le SIDA. No condom, no sex. / Gay or straight, it doesn't matter. The enemy is AIDS. No condom, no sex.
6. C'est chaud !!! Mais n'oublies pas ton préso et ton gel. /Things are heating up!!! But don't forget your condom and lube.
7. Protège-toi et protège ton partenaire. Utilise toujours le condom et le gel à chaque rapport sexuel. / Protect yourself and your partner. Always use a condom and lube at every sexual encounter.
8. Ma vie est précieuse. Je prends mes médicaments chaque jour pour être en santé. / My life is precious. I take my medications every day to stay in good health.
9. Bravo !!! Tu as retiré ton résultat. N'oublie pas d'en discuter avec ton partenaire pour conserver la confiance. / Bravo ! You received the results of your test. Don't forget to talk about it with your partner to maintain trust.
10. En cas de rupture du condom, pas de panique. Fais-toi examiner dans un centre médical dans les 24 heures pour avoir le cœur net. / If the condom breaks, don't panic. Get yourself tested in a medical center within 24 hours for peace of mind.
11. Prendre soin de ta santé. Fais ton dépistage des IST régulièrement. / Take care of your health. Get tested for STIs regularly.
12. Après usage du condom et lubrifiant. Je les emballe et les jeter dans une poubelle, hors de vue et de portée des enfants./ After using a condom and lube, I tie it up and throw it away, out of sight and out of reach of children.
13. N'oublies pas de te protéger ce soir. No condom, no sex. / Don't forget to protect yourself tonight. No condom, no sex.

## Appendix 2 - Variable Construction

Principal components analysis (PCA) is a common tool used to construct indices of various indicator variables, particularly in exploratory data analysis and for making predictive models. In this analysis, PCA was used to create the HIV-related knowledge indices. PCA is done by Eigen decomposition of a data covariance (or correlation) matrix. PCA output gives component scores, or factor scores, which represent (1) the transformed variable values corresponding to a particular data point, and (2) the weight by which each standardized original variable should be multiplied to get the component score. Component scores are then divided into quantiles (equally-sized segments) that best represent the cut-off point for analysis of a certain population.

Knowledge index: The HIV knowledge index was constructed with PCA using survey questions pertaining to respondents' knowledge of: (1) ways to reduce risk of HIV infection and transmission; (2) HIV testing locations; (3) where to receive HIV treatment and medications; and (4) where to find other related services (such as for gender-based violence, etc.). Respondents were not probed for responses; they were asked to list all the ways they know to reduce HIV risk. Responses included, among others, protected sexual intercourse, monogamy, and avoiding contaminated sharp objects. In addition, respondents were asked if they knew HIV testing locations and where to get services for HIV treatment. The final variable has three categories: low, intermediate and high.